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Coordination – the Key to Governing the Water-Land-Food Nexus in Zambia?

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Contents

Tables

Figures

Boxes

Abbreviations

DWRD	Department of Water Resources Development (Zambia)
EIA	Environmental Impact Assessment
GIZ	Gesellschaft für Internationale Zusammenarbeit
SEA	Strategic Environmental Assessment
USD	US dollar
USIP	Upscaling Smallholder Irrigation Project
WARMA	Water Resources Management Authority (Zambia)
ZEMA	Zambia Environmental Management Agency
ZESCO	Zambia Electricity Supply Corporation Limited
ZLA	Zambia Land Alliance

Executive summary

Zambia is endowed with abundant land and water resources, the utilisation of which offers huge potential for the country's economic development. For this reason, the Zambian Government has planned the gradual expansion of irrigated areas throughout the country to boost agricultural production and productivity to meet domestic food demands, to supply regional and international markets, and to create income and employment for smallholders and the rural population.

However, some river catchments already experience severe water stress, and changing land use from rain-fed to irrigation on a large scale may fuel competition, not only in those areas but also in areas where water resources are yet not fully utilised. But potential conflicts are not only about water: The expansion takes place in areas under customary land tenure, generating conflicts between commercial investors and pre-existing smallholders, and between local people and the chiefs administering the land.

These existing and emerging water- and land-related resource conflicts deriving from the large-scale expansion of irrigated areas are the starting point of this nexus study with water and land as the key resources.

Common complaints raised in the nexus discourse are "silo thinking" and "lack of coordination" assuming this may give rise to supply crises. Coordination, which carries the positive connotation of "good governance", seems to be the way out of the dilemma. In order to realise the government's vision of sustainable development in all its dimensions (economic, social and environmental), *good* governance and *effective coordination* is required. While we should avoid excessively optimistic expectations, coordinated inter-sectoral planning and the implementation of policies are desirable goals and might at least help to minimise resource conflicts and supply crises. But coordination between public sectors units is not automatically forthcoming, nor is it easy to initiate and sustain.

The Zambia study provides insights in coordination issues but argues that cross-sectoral coordination is not the only governance issue to be solved to minimise resource-related conflicts and their environmental and social impacts. The study analyses the modes at hand to coordinate activities of more or less independent public-sector units related to agricultural development activities, the kind of coordination problems and the barriers and hindrances to effective coordination.

The focus of the study is the planning and licensing process of large-scale public-private agricultural investment projects with water/irrigation infrastructure as major components. We applied the Network of Adjacent Action Situations (NAAP) concept that allows one to analyse complex policy settings and to specifically take account of the many decision-making public units that steer the Zambian water-land based agricultural development strategy.

Our analysis shows that Zambia has coordination modes in place that direct all ministries' activities towards commercialising agriculture through developing the country's under-utilised land and water resources by inviting private investors and promoting business models that link smallholders to established markets. Towards these ends, horizontal coordination between government units that are on the same hierarchical tier must be

improved (land-water-environment). It is evident from our analysis that the *integration of environmental and social aspects* in project planning and authorisation requires particular political attention in order to make investment projects sustainable right from the outset.

The study shows that governing the water-land-food nexus is not only a cross-sectoral coordination issue (horizontal coordination) but also an issue of effective vertical coordination. This is most evident regarding land issues. This governance issue originates from the plurality and concurrency of traditional and modern land-tenure systems. Coordinating and "harmonising" the traditional and modern land governance institutions is particularly difficult since it affects the legitimate basis of chieftaincy that is rooted in tradition and culture.

Effective implementation of the Zambian government's policy and strategy is also as much an issue of assigning distinct functions to public sectors units and equipping them with sufficient resources for implementation; of upgrading public units to fully fledged administrative units (Technical Services Branch Irrigation of the Department of Agriculture) and of considering viable financial models for the water authority WARMA.

In essence, coordination with all its facets is a tremendous governance challenge for the Zambian Government and defies simple solutions, all the more so as coordination is not the only governance gap Zambia has to tackle.

1 Introduction

Zambia is endowed with abundant land and water resources which provide considerable potential for the country's economic development. The Zambian Government has therefore planned the gradual expansion of irrigated areas throughout the country to boost productivity and production of the now dominantly rain-fed agriculture to meet domestic food demands, supply regional and international markets as well as create income and employment for smallholders and the rural population. Irrigation is also seen as one important means of building and improving the resilience of agriculture to climate-change impacts which are predicted to be particularly strong in Southern Africa (Hachigonta, Nelson, Thomas, & Sibanda, 2013).

However, the challenges facing the realising of the government's development plans are enormous, not least accessing financial sources for costly water storage and irrigation infrastructure. The increasing demand for water for agricultural irrigation coincides with an increasing demand for the generation of hydroelectricity. Resource conflicts already exist between main water users within individual river catchment areas. The former Minister of Energy and Water Development[1] reported that there were outstanding conflicts in the catchments of the rivers Lunsemfwa, Chalimbana and Kalye, within the farming community in the Mkushi district, and between farmers and the downstream hydroelectricity operators (GRZ [Government of the Republic of Zambia] & Hon. D. Siliya, 2016). Due to long-lasting droughts, the state-run Zambia Electricity Supply Company (ZESCO) and the many sugarcane growers – large and small – in the District of Mazabuka in the Lower Kafue catchment struggle over dwindling water resources. The increasing demand for water by Lusaka's growing population also has to be satisfied. Last but not least, maintaining the productive functions of one of Zambia's most important wetlands – the Kafue Flats – requires minimum flows in the river to be upheld (see Box 1 and Figure 1).

1 In October 2016, the ministerial landscape changed: the Ministry of Agriculture and Livestock was split up into the Ministry of Agriculture, and the Ministry of Livestock and Fisheries; the Ministry of Mines, Energy and Water Development was split up into the Ministry of Mines and Minerals, and the Ministry of Energy; a new water ministry was created, namely the Ministry of Water Development, Sanitation and Environmental Protection. Throughout the study we use the names as fits.

Box 1: The Lower Kafue catchment – a showcase for coordinating the use of natural resources

With the Lower Kafue catchment it is important to emphasise that it is a region whose economy runs on water. The sub-catchment area generates 50 per cent of Zambia's hydroelectricity at Kafue Gorge Dam and provides 44 per cent of water for Lusaka's residents; it produces 90 per cent of sugarcane for domestic and export markets and is one of Zambia's maize-producing centres; it supports 20 per cent of the national cattle herd, attracts 30 per cent of national tourism, and sustains one of Zambia's most productive wild fisheries. Overall, therefore, it supports the livelihoods of more than 900,000 people (Chomba & Nkhata, 2016; WWF [World Wildlife Fund], 2016).

However the Lower Kafue is under severe water stress not only due to increasing hydrological extremes[2] but also to over-allocated water-rights' certificates. Under normal hydrological conditions, the water resource base might appear adequate, but Zambia experienced a recurrence of droughts in 1991/1992, 1994/1995, 2000/2001 and most recently in 2015/2016 resulting in lower than average rainfall.

Droughts affected all water users. Drought-induced power cuts affected schools, hospitals, urban households, small companies and agricultural operations of all sizes in the region. Zambia Sugar Ltd, one of the largest agricultural enterprises that cultivates sugarcane on its 16,000 hectares-large estate, and the out-grower Kaleya Smallholders Company Ltd (that cultivates sugarcane on 4,000 hectares) could not use their full water entitlements since receding water flows in the river caused pumping costs to be higher than usual.

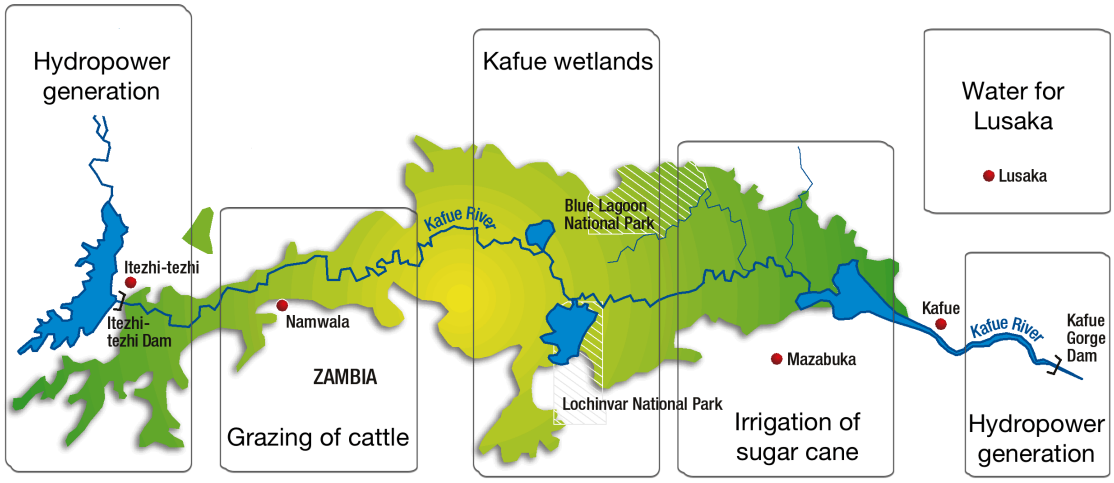
The Kafue Wetlands – and the ecological functions they provide – and the sugarcane growers depend on the Itezhi-tezhi Dam operator's water releases. It is the Itezhi-tezhi Dam that regulates the river flow upstream of Zambia Sugar Ltd and other growers for the Kafue Gorge Dam. In turn, water used by Zambia Sugar Ltd and others affects downstream river flows and, hence, water supply to the capital Lusaka and the hydroelectricity generation plant of the Kafue Gorge. The water utility serving the capital Lusaka, which is one of the fastest growing cities in Africa with a population of about 2.45 million inhabitants, withdraws water from the Kafue from an offtake pipe downstream of the agri-business zone in the Mazabuka district and upstream of the Kafue Gorge Dam. In the absence of a formal water-sharing agreement, the Zambia Electricity Supply Company (ZESCO) and Zambia Sugar Ltd have come up with a working agreement: Zambia Sugar Ltd reports on a daily basis to ZESCO the amount of water withdrawn. In turn, ZESCO provides data on water releases from the Itezhi-tezhi Dam (Interviews Zambia Sugar Ltd, 2 October 2015).

Due to decreasing water levels, electricity generation also declined to such a level that ZESCO was incapable of supplying companies and urban consumers during the summers of 2015 and 2016. These were left without electricity for eight to sixteen hours per day, with water supplies frequently also down, as the pumps could not work without power. Those who could, turned to diesel generators. The effects on the copper mines were particularly dramatic: as a result of the outages, the Mulyashi Open Pit Mine and Baluba Underground Mine were forced to lay off 1,640 workers in September 2015, as supplies to the private Copperbelt Energy Corporation were cut. Since September 2015, the Copperbelt Energy Corporation has seen its electricity volumes cut first by 30 per cent and later by 16 per cent.

As a result of the irrigation projects planned, water demand for agriculture is expected to rise drastically in the Lower Kafue catchment from around 1,000 million cubic meters (MCM)/year to 2,400 MCM/year in 2020 (Chomba & Nkhata, 2016). There already, about 64 per cent of Zambia's irrigated area is located, withdrawing water of up to 73 per cent to irrigate sugarcane (90 per cent of all sugarcane grown in Zambia is cultivated there).

2 "Although rainfall levels have not significantly declined over the period 1950–2010, rainfall exhibits high inter-annual variations and more frequent extremes" (Mulenga, Ngoma, & Tembo, 2015, p. 105).

Figure 1: Water users in the Lower Kafue catchment



Source: Authors, modified from WWF (2016)

While some river catchment areas like the Lower Kafue already experience severe water stress, changing land use from rain-fed to irrigated on a large- and country-wide scale will fuel competition between sectoral water users elsewhere where water resources are yet not fully exploited. The Zambian government intends to expand irrigated areas and commercialise agriculture, arguing that the agricultural sector has so far fallen short of its development potential inter alia due to a lack of investments in water storage and water distribution infrastructure (Chisanga & Chapoto, 2015). Under-investment in the irrigation sub-sector has meant that only 3 per cent of the area cultivated is irrigated, while more than 90 per cent of agricultural production is still rain-fed farming where farmers depend on erratic rainfall patterns (Amjath-Babu, Krupnik, Kaechele, Aravindakshan, & Sietz, 2016). Only 10 per cent or so of the country's water resources are used for irrigated farming purposes.

The country-wide Farm Block Development Programme has the ambitious goal of driving agricultural commercialisation on over one million hectares of land, a considerable proportion of which will be irrigated. The Farm Block Development Programme covers nine farm blocks in all provinces and has about 100,000 hectares per block. The farm block concept involves agribusiness ventures of large-, medium- and small-scale enterprises and intends to link smallholders to stable markets for irrigated produce and to processing facilities. With support from the African Development Bank and Finland, the government through its Ministry of Agriculture is also preparing 27 new smallholder irrigation investment projects in nine of the country's ten provinces, covering a total of 12,000 hectares. This will increase the area under irrigation by 8 per cent. Both project types (large and small) will be implemented in river catchments where water and land are yet under-utilised. These projects will increase blue water consumption and may fuel competition with other sectoral uses that are under development.

But the conflicts are not only about water: the expansion of irrigation on a large scale mostly takes place on land under customary land tenure. Conflicts between commercial investors and existing land users are reported, but also between local people and the chiefs administering the land. For instance, local residents (pastoralists) protested against and

objected to a planned irrigation scheme in Mbeza located in the Kafue River catchment area which was supported by local authorities (Haller, 2013).

Existing and potential resource conflicts over water and land are the starting point of our study, water and land being the critical natural resources underpinning agricultural development. The Lower Kafue case has inspired us to investigate whether coordination exists across public sector organisations (ministries and administrations) whose planned activities rely on the same resources. Is coordination key to governing the water-land-food nexus in Zambia? That is what we want to understand.

The focus of our study is land-water based investment projects in agriculture that are promoted by the Zambian Government. Our study aims at providing insights into

- the coordination modes at hand,
- the kind of coordination problems, and
- the barriers and hindrances against making coordination – and the integration of social and environmental aspects – work.

Based on the interviews made during field visits in 2015 and 2016, we also put forward recommendations and invite comments on how to make coordination more effective.

This Discussion Paper is structured as follows: Section 2 reviews how governance figures in the nexus discourse and presents the framework used to analyse the water-land-food nexus in Zambia. Section 3 provides in-depth analyses of the action situations selected: these are intended to cover all the decision-making areas relevant for realising the Zambian Government's policy on water-land based agricultural development with irrigation as one key component. Section 4 presents our findings, and Section 5 recommendations.

2 Governance in the nexus discourse

Interdependencies in the utilisation of natural resource are real-world phenomena, and countless. They are not new phenomena: concerns were growing in the late 2000s about global food, water and energy security. Such resource interdependencies were given the new label "Nexus" when the World Economic Forum in 2008 pushed for this terminology. There "prominent business leaders issued a 'call to action' on the ways in which water is linked to economic growth across a nexus of issues" (Water Resources Group, 2030, 2012). In 2011, the World Economic Forum launched a landmark report on the nexus (WEF Initiative, 2011); and the Bonn Conference of 2011 promoted the nexus in policy circles and organised the "Water-Energy-Food Security Nexus: Solutions for the Green Economy" (background paper by Hoff, 2011). The World Water Development Report of 2014 also promoted a nexus approach and argued that "the global community is well aware of food, energy and water challenges but has so far addressed them in isolation, within sectoral boundaries […] decision-makers need to consider broader influences and cross-sectoral impacts" (WWAP (United Nations World Water Assessment Programme)/UN-Water, 2014). The UN Sustainable Development Goals (2015) gave further impetus to a nexus approach across water (SDG 6), energy (SDG 7) and food (SDG 2) when pushing for policy coherence (Müller, Janetschek, & Weigelt, 2015). A nexus approach can, so the expectations, be the way out by identifying and strengthening synergies and reducing trade-offs. The nexus approach would provide "a

frame within which a particular problem can be addressed" (Muller, 2015, p. 686), moving away from a one-sided water-centric perspective which focuses on problem-sheds rather than on watersheds as the Integrated Water Resources Management (IWRM) approach does.

In the meantime, the nexus terminology is widely used to describe resource interdependencies, and publications on the nexus have increased tremendously (Pahl-Wostl, 2017, p. 3). Moreover, the term has entered the language of international organisations, multinational corporations, non-governmental organisations (NGOs), political circles and so on. However, despite this proliferation, there is neither a consensus interpretation of what a nexus approach is, nor on what "governing the nexus" actually means (Scott, 2017). On the other hand, there *is* agreement that "the nexus approach treats different sectors as equally important (i.e. multi–centric)" (Benson, Gain, & Rouillard, 2015, p. 780) and that the "overarching governance problem is that policies are fragmented", that ministries are designed to work in silos, and that sectoral forces are strong (Leck, Conway, Bradshaw, & Rees, 2015). And there is also consensus that the goal to achieve is "policy coherence" (Pahl-Wostl, 2017; Weitz, Strambo, Kemp-Benedict, & Nilsson 2017, p. 166).

Those advocating a nexus approach assume that the lack of cross-sectoral coordination would lead to unintended consequences of policies implemented in one sector resulting in negative externalities in other sectors and may give rise to supply crises and the unsustainable use of natural resources. Lack of cross-sector coordination is viewed as the major governance gap. The possible solution is coordination, a term that carries the positive connotation of "good governance".

Concerns about inter-sectoral coordination are not new: back in the 1980s, Pressmann and Wildavsky (1984) mention the lack of inter-sectoral coordination as the most frequently cited issue why the provision of public services is poor, and Bouckaert et al. state that "coordination is one of the oldest problems facing the public sector" (Bouckaert, Peters, & Verhoest, 2010, p. 13) due to the complexities of multi-sector governance.

"All governments have to do is to have their programmes and organisations identify the means of taking into consideration and the actions of other organisations and programmes, and consider in advance the consequences of their decisions" (Bouckaert et al., 2010, p. 15). Thomassen and Lorenzen (2001) and Gulati and Singh (1998) understand coordination as the alignment of tasks and activities of independently operating actors (ministries, public administration) to jointly accomplish set objectives.

Fritz Scharpf (1993a, 1993b) has characterised this as "positive coordination" (build coherence). However, he assumes negative coordination (minimise conflict) to be the predominant type. Scharpf distinguishes these two strategies by pointing to the information and coordination costs involved. These costs explain why coordination is not automatically forthcoming despite high expectations that coordination can save scarce public financial sources, contribute to the optimal allocation of resources, limit the utilisation of natural resources (lower environmental impacts), improve economic efficiency, avoid negative cross-sectoral effects and create synergies that are not attainable through individual actions.

Research on the public administrations of industrialised countries – particularly the member states of the European Union – found that key attributes of public administration such as specialisation, differentiation, hierarchy, adherence to one particular organisation's procedural rules and the dedication towards clients not only brings about coordination needs

but at the same time hinders cross-sectoral communication and coordination (Bouckaert et al., 2010; Bougumil & Jann, 2005; Pollitt & Bouckaert, 2004). Ministries and administrations are assigned with formal mandates that characterise the spheres of authority over which they enjoy discretionary power and which they try to maintain. The specialisation of public administrations leads to a narrow focus on mandates and tasks (Bougumil & Jann, 2005; Scharpf, 1993a), ignoring the negative effects that sector policy A has on sector B. And, since relations between public sector units are not on an equal footing (Lele, Klousia-Marquis, & Goswami, 2013) but are asymmetric, reflecting national priorities mirrored in the resources one can deploy, coordination faces even more barriers not the least of which are lack of interest, ignorance, the reluctance to share information, and power relations. As such, "vested interests and unequal power relationships can determine how nexus interdependencies are handled" (Scott, 2017, p. 6).

Coordination challenges are redundancies (a duplication and/or overlapping of responsibilities); lacunas (absence, gaps and/or a lack of regulation); and incoherencies (contradictions, frictions in policies and implementation measures) (Weitz, Strambo, Kemp-Benedict, & Nilsson, 2017, p. 168). Moreover they have at least two dimensions and relate to two processes: horizontal and vertical coordination (or as phrased by Pahl-Wostl (2017), coordination is "[a] multi-level challenge"). A nexus approach requires coordination and integration across levels of governments (vertical) and across sectors (horizontal) (Scott, 2017). Horizontal coordination is a process where *government units on the same hierarchical tier* are involved (Malone & Crowstone, 1990). A diversity of interaction modes can be deployed such as co-signature to a lead actor's decision, consultations, communication platforms, representation in decision-making bodies, inter-ministerial committees with/without authority (advisory), exchange of data and information, procedural administrative rules, and planning instruments (Bogumil & Jann, 2005). Vertical coordination refers to processes *between levels of government* (central and local), and its effectiveness relies and rests on (the execution of) authority. The degree to which coordination, both horizontal and vertical, de facto influences output and outcome, is a matter of empirical research and not a priori fixed.

According to Weitz, Strambo, Kemp-Benedict, & Nilsson (2017, p. 165), coordination and integration[3] problems can be solved by changing the institutional structure, by changing procedures, and by using communicative instruments. But what are the "conditions for cross-sector coordination and collaboration"? This is a major research gap that Weitz et al. (2017) have identified in reviewing literature on nexus governance.

3 Integration is understood as "the incorporation of environmental objectives into all stages of policy making in non-environmental policy sectors […] to minimize contradictions between environmental and sector policies" (Lafferty & Hovden, 2003, p. 9).

The Zambia study

This study has taken up the notion of this research gap and investigates the following:

- What are the coordination modes[4] at hand?
- What are the coordination challenges?
- What are the barriers/hindrances to making coordination work towards defined targets?

The expansion of irrigated agriculture is the focus of this study and can be portrayed as a water-land-food[5] nexus case, which involves two key resources – land and water – both essential for food production and eventually food security. Planning and licensing of large-scale water-land based agricultural investment projects with irrigation components takes place in many independent but interlinked arenas. The extended Institutional Analysis and Development (IAD), that is, the Network of Adjacent Action Situations (NAAS) (McGinnis & Ostrom, 2014), provides a useful framework for analysing complex settings where multiple, independent decision-making centres decide on water-land based development activities.

McGinnis & Ostrom define an "action situation" as an arena where "individuals interact with each other and thereby jointly affecting outcomes. The actors in any situation are presumed to be boundedly rational. They seek to achieve goals for themselves and for the communities which they identify with but do so within the context of ubiquitous social dilemmas and biophysical constraints, as well as cognitive limitations and cultural predispositions" (McGinnis & Ostrom, 2014). The adjacency of action situations considers multiple arenas and means that "action situation A is adjacent to B if the outcome of A influences the dynamics of B" (McGinnis & Ostrom, 2014).

In order to operationalise the analysis, we first identified and selected action situations that cover all those decision-making arenas relevant for realising the Zambian Government's policy on water-/land-based agricultural development projects with irrigation being one key component. The action situations selected are functionally and sometimes formally connected. However, there is no chain of command between them even if their relationships are guided by prescribed procedural rules.

In identifying and selecting action situations, we only consider those arenas that are closely related to and influence the use of the natural resources land and water (see Table 1). The study is restricted to analysing coordination at the strategic (planning) level, and coordination related to planning and licensing of land-water agricultural based investment projects.

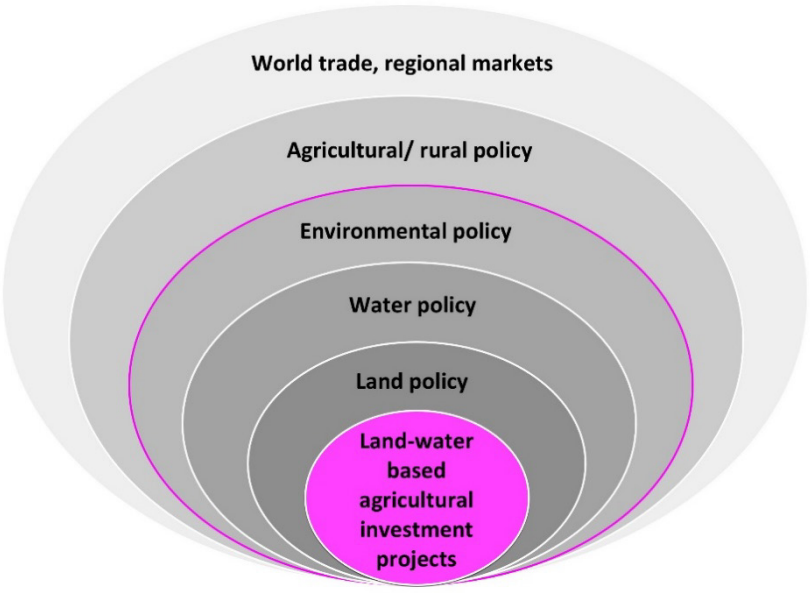
4 Throughout the study, we use the neutral term "mode" to embrace instrument and mechanisms.

5 We prefer to frame the nexus as a water-land-food nexus and not as is usually done as a *water-energy-food nexus*. In this way we emphasise the study's focus on land-water based investment projects in agriculture. In principle, energy could be included but is not, so as not to increase the complexity further.

Table 1: Agricultural land-water based investments and adjacent action situations	
National level	
Lead actors	**Mandates/Issues dealt with**
Action situation 1: Ministry of National Development Planning	Five-Year National Development Plans
Action situation 2: Ministry of Agriculture, Department of Agriculture	Policy and strategy for irrigation sub-sector
Project level	
Lead actors	**Mandates/Issues dealt with**
Action situation 3: Ministry of Agriculture, Department of Agriculture	Project planning, investment license
Action situation 4: Commissioner of Lands, Ministry of Land	Land acquisition and land titling
Action situation 5: Zambia Environmental Management Agency	Environmental authorisation
Action situation 6: Water Resources Management Authority	Water permit approval
Source: Authors	

We excluded factors and dynamics that also influence the water-land-food nexus such as investment and trade regimes, and marketing regimes of specific crops (for instance sugarcane) (see Figure 2). This exclusion can be justified on the ground that our focus is restricted to the planning and licensing phases of water-land related decisions. We therefore also consider "only" the land aspect and not the broader issues of agricultural policy (such as access to credits, subsidies for maize, and so on).

Figure 2: The complexity of the water-land-food nexus



Source: Authors

We then identify the major actors involved in the respective action situations, the functions assigned, the social and political dynamics, the constraints under which they operate, and the coordination modes at hand.

Our analysis aims to specifically identify the formally prescribed linkages – or coordinating modes – within and across the action situations that work in favour of accomplishing objectives; how social and environmental aspects are integrated; on the existing coordination problems and challenges as perceived by the interviewees and the insights we gained.

Empirical work for this study was carried out during two visits in Zambia. The first visit took place in October 2015, the second in May 2016, each of them lasting about two weeks. Field visits took us to the Mazabuka district, the largest irrigated area in the country, to large-scale enterprises and small-scale irrigation schemes, and to the Lufwanyama District where the Luswishi farm block is located and where irrigation will be developed.

We conducted personal semi-structures interviews (compiled summary notes) with a large number of public officials, other stakeholders, experts, researchers, and key informants (see Annex I). We reviewed policy documents, reports and research publications, and accessed the websites of ministries and non-governmental organisations.

3 Coordination to govern the water-land-food nexus in Zambia

The following sections analyse the action situations that relate to large-scale agricultural water-land based investments.

3.1 Coordination at national level

At national level, action situations comprise the Five-Year National Development Plans, and the Policy and Strategy of the Irrigation Sub-Sector. The National Five-Year Development Plans define targets, including those of the irrigation sub-sector. Together with national laws, they are the binding documents that coordinate ministerial activities. The irrigation policy and strategy then "translates" the government's strategy to the sub-sector. There, development objectives are set, desirable outcomes formulated, and instruments towards these ends selected including financial sources (private-public) and economic incentives for attracting private investors. While coordination modes are in place, requisites with a view to making them effective are lacking, such as robust data and operational guidelines (see Table 2 and Table 3 for an overview).

3.1.1 Action situation 1: Five-Year National Development Plans

The Five-Year National Development Plans are the key planning documents that formulate the strategic development goals of the respective governments. National Development Plans were reintroduced in 2002 and up to now provide a platform for a coordinated and systematic approach to the long- and medium-term planning of national development goals. This can be evidenced by the development and implementation of the Poverty Reduction Strategy Paper (2002-2004), the Transitional National Development Plan (2006-2005),

Vision 2030, the Fifth National Development Plan (2006-2010), the Sixth National Development Plan (2011-2015), the Revised Sixth National Development Plan (2013-2016), and finally the Seventh National Development Plan (2017-2021).

The National Development Plans contain specific policies, programmes, and projects predominantly targeted towards economic diversification of the agricultural sector. So far, the National Development Plans have been instrumental in achieving some key developmental outcomes such as reducing poverty and vulnerability, reducing inequalities, improving the governance environment, enhancing human development and economic diversification. These outcomes have helped Zambia to graduate from being a least developed country to moving towards a prosperous middle-income country. In 2016, the per capita gross national income (GNI) was USD 1,360 against the threshold of USD 1,242 that separates low- from middle-income countries (World Bank, 2016).

The planning process involves consultations with key stakeholders including government units as well as those at the provincial level, academic and research organisations, civil society, faith-based organisations, the private sector, traditional leaders, the general public and cooperating partners. The planning process used is a combination of a bottom-up and a top-down approach, the latter with a view to harmonising the plans with regional and global development benchmarks and targets. Both the Ministry of National Development Planning and the Ministry of Finance have a Monitoring and Evaluation Unit for overseeing the implementation. Each of the line ministries is expected to submit a quarterly progress report on implementation which are then combined and submitted to the Cabinet.

In support of promoting productivity and increasing food production, the expansion of land to be irrigated has received high priority during the last decades. Already, the Fifth National Development Plan (2006-2010) acknowledged that water was one of the key factors that can foster the growth of the agricultural sector. The Revised Sixth National Development Plan (2013-2016) and the Medium-Term Expenditure Framework (2016-2018) prioritised irrigation development ("[…] agriculture as a priority sector for economic growth, poverty reduction and job creation" (GRZ [Government of the Republic of Zambia], 2011, Sixth National Development Plan)) while the Seventh National Development Plan (2017-2021), which is the current guiding document, has re-enforced this perception:

> Development outcome 1: A diversified and export-oriented agriculture sector […] irrigation development remains a key intervention for increasing crop diversification, production and productivity. Strategy 5: Enhance investment (public-private partnership) in agricultural infrastructure: […] prioritised to create a conducive environment for a vibrant agriculture sector. […] to enable the sector to produce, process and market its various products competitively in the domestic, regional and international markets. Key among such infrastructure will be warehousing, storage, breeding centres and irrigation. (GRZ & Ministry of Finance and National Planning, 2017, pp. 61, 63)

To attract private investors, the Zambian government passed the Public-Private Partnership Bill as early as 2009. Inclusive agricultural business models are supposed to link smallholder farmers to commercial markets by mobilising idle assets readily available to smallholder farmers (land, family labour and water) and combining them with scarce assets not available to them (finance, technical expertise, commercial skills). They also address core constraints of agriculture such as input supply, access to financial services, markets, and so on.

The National Development Plans, the National Water Resources Master Plan (1995), the National Water Policy (2010), the Irrigation Policy and Strategy (2004) and the National Agricultural Policy (2004, 2010) share the vision of making productive use of Zambia's land and water resources, and of increasing access to water for agriculture. The documents share the understanding that land[6] and water are abundant, and that Zambia suffers from under-utilised land and economic – not physical – water scarcity emphasising the need for developing water storage and bulk water infrastructure. Land held under customary tenure, which is assumed to cover about 94 per cent of Zambia's territory,[7] is targeted for development.

> Zambia has from time to time suffered severe droughts, resulting in greatly reduced yields and large losses of livestock. The country has abundant water resources. The greatest challenge is to find ways of utilizing the water resources more efficiently by promoting irrigation. Irrigation has a significant role to play in improving household food security especially among small-scale farmers. Irrigation, not only supplements rainfall in meeting crop water requirements in times of drought, but also allows the planting of crops to occur at times of the year when dry land planting could not occur. (GRZ & Ministry of Agriculture and Co-operatives, 2004, p. 21)

The National Water Policy of the Ministry of Energy and Water Development favours measures to develop and manage water resources in support of the agricultural sector, and argues for the development of a fair, efficient and transparent water allocation system (GRZ & Ministry of Energy and Water Development, 2010, p. 25).

Sector Advisory Groups were established in 2003 to provide input into the Five-Year National Development Plans and into sector policies. Until 2017, they were a major part of the coordination framework. The Water Sector Advisory Group was intended to handle coordination of water resources infrastructure development. The Water Sector Advisory Group was chaired by the Permanent Secretary of the then Ministry of Energy and Water Development; other ministerial stakeholders were members of the sub-committees.[8] However, the Zambian Government departed from the Sector Advisory Groups and institutionalised so-called *clusters* with the aim of promoting an integrated approach:

> The integrated approach recognizes the multi-faceted and interlinked nature of sustainable development which calls for interventions to be tackled simultaneously through a coordinated approach to implementing development programs. […] has the advantage of considering the comparative and competitive advantages of the regions in

6 The Minister of Agriculture argues that Zambia can be considered a land-poor country with only five hectares per capita because few lands are state land and under statutory tenure (Interviews Lubinda, Minister of Agriculture, 6 May 2017).

7 Recent data contradict this estimate and assume that 54 per cent (that is, 40 million hectares) or 51 per cent (that is, 38 million hectares) are realistic figures (Sitko & Chamberlin, 2016).

8 The Infrastructure and Development sub-committee was chaired by the Director of the Department of Agriculture under the Ministry of Agriculture; the Water Resources Management sub-committee was chaired by the Director of the Department of Environmental Protection under the Ministry of Land, Natural Resources and Environment Protection; the Water Supply and Sanitation sub-committee was chaired by the Director of Water Supply and Sanitation under the Ministry of Water Resources Development, Sanitation and Environmental Protection; Monitoring and Evaluation was chaired by the Director of the Centre of the Statistic Office under the Ministry of Finance and Planning.

> allocation of resources towards implementation of the multi-sectoral strategies and setting in motion a series of mutually supporting activities in different sectors with the general objective of delivering the national agenda. Ultimately it is envisaged that the integrated development approach […] will help change the focus of government line ministries and provinces from competing with each other to coordinated harmonization. (GRZ & Ministry of Finance and National Planning, 2017: Foreword of the President of Zambia)

Table 2: Action situation 1: Five-Year National Development Plans	
National Development Plans	
Lead actor	Ministry of National Development Planning
Actors involved	Final decision by the President, the Cabinet oversees preparation and monitors implementation Stakeholders including non-governmental organisations, civil society groups, private sector
Objective	Economic growth by developing land and water resources (to expand irrigated land), commercialisation of agriculture
Coordination	Input from all line ministries, government institutions, provincial and district development coordinating committees, NGOs, private sector institutions, civil society, faith-based organisations and traditional leaders Water Sector Advisory Group (input into National Development Plans and sector policies; coordinated water infrastructure development), new *clusters* institutionalised Binding documents (Water Resources Management Act, Water Policy, Agricultural Policy, Irrigation Policy and Strategy, National Water Resources Action Plan and Master Plan)
Issues/challenges	Facilitation of an integrated development approach by institutionalising clusters (their effectiveness has yet to be proven)
Source: Authors	

3.1.2 Action situation 2: Irrigation policy and strategy of 2004

The Irrigation Policy and Strategy of 2004, the revision of which is ongoing, is the document that translated the national development targets for the irrigation sub-sector. Estimates as of 2004 indicated a total of about 155,000 hectares under irrigation, the majority of which was irrigated by surface water and was located in the Central, Lusaka and Copperbelt provinces.[9] The then Ministry of Agriculture and Cooperative's (MACO) Strategic Plan for Irrigation Development 2002-2006 estimated the economic irrigation potential as high as 423,000 hectares and identified 85 areas throughout the country with development potential (GRZ & Ministry of Agriculture and Co-operatives, 2004).

9 More recent estimates assume that "Zambia has the potential to develop 2.75 million hectares of land under irrigation but less than 200,000 hectares are actually irrigated. Therefore, irrigation development remains a key intervention for increasing crop diversification, production and productivity. During the period 2011-2016, only 17,800 hectares of new land were brought under irrigation, of which 6,800 hectares were through public investments while 11,000 hectares were through private sector investment" (GRZ & Ministry of Finance and National Planning, 2017, p. 62).

The Strategy's emphasis has been on "promoting the growth of agriculture through the promotion of irrigation. […] In comparison to the neighbouring state of Zimbabwe, Zambia appears to have under-utilized its huge irrigation potential" (GRZ & Ministry of Agriculture and Co-operatives, 2004, p. 2). Due to under-investments in water storage and distribution infrastructure, among other reasons, Zambia's agriculture is dominated by rain-fed agriculture and is dependent on irregular, uncertain rainfall patterns. The "agricultural sector is characterized by a large number of poor smallholders contributing most of the agricultural output, with low yields, limited commercialization and few signs of rapid productivity growth" (Matenga & Hichaambwa, 2016, p. 1). On this issue, the Seventh National Development Plan reads as follows:

> Inadequate water resource development and supply – Zambia's inability to adequately harness its vast water resources is a binding constraint to growth in a number of sectors, such as agriculture, manufacturing, energy, transport, mining and tourism. […]
>
> Low access to land – Land is an important resource for investment, production of goods and services in the economy, wealth creation and ultimately poverty reduction. However, there are several constraints in accessing land on title, such as inadequate information on land issues, inefficiencies and delays in processing title deeds and insecure land-tenure systems. (GRZ & Ministry of Finance and National Planning, 2017, pp. 58, 59)

The strategic aim of the government's guiding policy document "Strategy for the Development of Zambia's Irrigation Sector" has been to lay the ground for expanding the emerging farmer base by promoting commercial enterprises, building on the experience of the commercial agricultural sector. The strategy's targets are flexible and follow political considerations (Interview Minister Agriculture, 6 May 2016), meaning that the projects planned (farm blocks, medium-/small-scale) are not based on any strict feasibility considerations (GRZ & Ministry of Agriculture and Co-operatives, 2004, p. 10).

Coordination is being addressed in diverse ways

First, the Irrigation Policy and Strategy (2004) and the National Agricultural Policy (2004) were both developed under the aegis of the Ministry of Agriculture (see Table 3). They explicitly refer to strategic national water documents such as the National Water Resources Action Plan and the National Water Resources Master Plan (1995) and refer to water and land availability in the respective agro-ecological zones including recommendations for suitable crop patterns. The Strategy recognises the already existing pressure on water resources in some basins (for example, Lower Kafue) stating that "under normal hydrological conditions, the water resource base might appear adequate" (GRZ & Ministry of Agriculture and Co-operatives, 2004, p. 3). However, Zambia has experienced a recurrence of droughts in 1991/1992, 1994/1995, 2000/2001 and most recently in 2015/2016 resulting in lower-than-average rainfall. These incidents have provided the stimulus to expand water storage and design new, flexible water allocation rules in order to be able to respond to climate-change impacts and to changing demand patterns (Mulenga, Ngoma, & Tembo, 2015).

The basis for assessing the agricultural potential are the three agro-ecological zones. These zones are delineated on the basis of annual rainfall patterns and not on long-term observations of a river's flow regime due to a lack of, or not functioning, gauging stations (Interviews Provincial Water Officer; Interviews Zimba; Interviews Phiri, 6 May 2016; Interviews WARMA Namayanga, 21 September 2015). These zones suit rain-fed agriculture but are not

sufficient for identifying locations suitable to irrigated agriculture. The Water Resources Management Authority (WARMA) is now (March 2018) engaging in developing a National Water Resources Strategy and Implementation Plan that will make it possible to assess the impacts of projects on water resources; it will also provide adequate information for deciding on irrigation project locations (Interviews GIZ Zambia, March 2018).

Second, WARMA and the Zambian Environmental Management Agency (ZEMA) will be involved in the ongoing revision process of the National Irrigation Policy and Strategy. A first draft was prepared and submitted to the Ministry; stakeholder consultative workshops are scheduled to take place in 2018.

Third, an inter-sectoral planning group has been set up for the realisation of the Farm Block Development Programme. As such, the government has acknowledged that, in order to realise Zambia's full development potential for irrigation, Zambia needs to invest in the construction of access roads; the construction of dams, weirs, boreholes and irrigation systems, and in the electrification of the schemes. The government finances basic infrastructure such as roads, bridges, electricity, and water storage and distribution infrastructure up to field level, while the private sector (agribusiness and others) would finance on-farm activities (for instance, land clearance), on-farm infrastructure (roads, irrigation technology) and processing facilities (Interviews Chief of Farming Global Plantations Ltd, May 2016; Interviews Shula, Principal Agriculture Specialist, Ministry of Agriculture, 4 May 2016).[10] The inter-sectoral planning group supports the implementation of the Farm Block Development Programme since this is a large, special government programme for which coordination is essential to provide an attractive – infrastructure – package for investors. However, this does not apply to smallholder irrigation schemes that are not linked to farm blocks.

Fourth, according to the Environmental Management Act of 2011 (Part III, 23.), at this stage, a strategic environmental assessment (SEA) should be applied to assess the impacts of individual farm blocks (Interviews ZEMA Mwenbela, 9 October 2015).[11] The SEA would act as a coordination instrument and would assess the cumulative effects of the irrigation projects planned along one watercourse, reviewing the suitability of sites in terms of topography, as well as water availability and soil suitability. A SEA would assess in a preliminary way the limits within which the utilisation of water and land resources could take place; where consumptive, commercial water uses should be restricted due to environmental flow requirements (that is, Water Reserve and Statutory Minimum Flows[12] as requested by the Water Resources Management Act), and the limits set by international

10 "New farm blocks would be opened up in each of the nine provinces and also provided with the necessary infrastructure such as feeder roads, bridges, storage sheds, electrification, dams and canals so as to attract both local and foreign investment in agriculture. The Ministry would liaise with the Ministry of Lands to facilitate availability and accessibility of land for agricultural development" (GRZ & Ministry of Agriculture and Co-operatives, 2004, p. 10).

11 SEA applies to "[…] policies, plans and programmes relating to national development of urban and rural areas, land use, livestock, transport, the exploitation of minerals, industrial development, water utilisation, agriculture and any other sector" (Environmental Management Act, 2011).

12 Operational rules are suggested by the authors of the "Technical Content for Draft Regulations or Statutory Instruments under the Water Resources Management Act No. 21 of 2011" but have not yet been decided. ZEMA has already developed environmental flow guidelines from which lessons could be drawn (Technical Content for Draft Regulations or Statutory Instruments under the Water Resources Management Act No. 21 of 2011, p. 113).

agreements related to the utilisation of transboundary rivers. However, there are currently no workable SEA guidelines for irrigation projects although there are for roads, mining and tourism which could serve as examples. Such guidelines would need to be drafted by ZEMA and concerned stakeholders, for instance WARMA, and approved by parliament to become legally binding.

Fifth, an ad hoc instrument, namely the Joint Water Sector Review (JWSR), was devised in 2014 by the then Ministry of Energy and Water Development and the Ministry of Agriculture[13] to improve collaboration across ministries which was perceived as insufficient. The Joint Water Sector Review covers the years 2011-2013 and was issued to guide and improve the management and further development of the water and sanitation sector in Zambia (including water in agriculture). It takes stock of achievements, bottlenecks and weaknesses in the sector as a whole and its sub-sectors water supply and sanitation as well as water resources management and development. The Joint Review Team recommended one annual work plan to be prepared for the programme of dam construction for irrigation with inputs from the Ministry of Water, Sanitation and Environmental Protection, and the Ministry of Agriculture; and that the drilling of boreholes and dam construction which are currently executed under the Department of Water Resources Development should be undertaken by the private sector and licensed by WARMA. The Joint Review Team also recommended that the Technical Services Branch Irrigation in the Ministry of Agriculture should be transformed into a full department in order to increase its capacity (GRZ & Ministry of Energy and Water Development, 2014).

Table 3: Action situation 2: Policy and strategy of the irrigation sub-sector	
Lead actor	Department of Agriculture, Ministry of Agriculture
Actors involved	Ministry of Finance and multilateral, bilateral financiers
Objective	Economic growth by developing land and water resources (expansion of irrigated land), commercialisation of agriculture
Coordination	National Agricultural Policy and Irrigation Policy and Strategy under the aegis of the Ministry of Agriculture Consultative group comprising WARMA and ZEMA to provide input into irrigation strategy Inter-sectoral infrastructure planning group for Farm Block Development Programme (dams, roads, electricity) Ad hoc instrument (Joint Water Sector Review) devised in 2014 by the Ministry of Water Resources Development and the Ministry of Agriculture Data exchange
Issues/challenges	Lack of operational guidelines (SEA, statutory minimum flows) Deficient data on water availability, water rights allocated, and water and land actually utilised
Source: Authors	

13 The study was supported by the German Gesellschaft für internationale Zusammenarbeit (GIZ).

3.2 Coordination at project level

The following action situations cover arenas where public-sector units decide on agricultural investments with irrigation projects as the "technical" means to realise the government's policy and strategy for the irrigation sub-sector. Analyses cover the phases from project planning to authorisation. The agricultural investment projects with irrigation components are usually public-private partnership (PPP) projects where the government finances the bulk water infrastructure with credits from multilateral/bilateral financiers, and the private partners either provide land, or finance on-farm development works and investments in processing and marketing facilities. Investments are or will be implemented on formerly customary land, and should be economically, socially and environmentally viable.

The action situations analysed below are "adjacent" to each other, or nested, meaning that decisions taken in one "produce inputs" for others. Decisions are guided by prescribed step-by-step procedures. Coordination is required horizontally (between the same tier of government), vertically (between central and local level units of line ministries), between public-sector units and societal actors, and between the "modern state apparatus" and traditional authorities.

3.2.1 Action situation 3: Planning and licensing of (irrigation) projects

Action situation 3 is the locus of planning and licensing agricultural investments with irrigation components. It is part of sequenced authorisation steps (land title, environmental impact assessment (EIA), and water certificates) that finally result in the authorisation of a project. It is in this action situation where recourse to the natural resource base – water and land – is made. Coordination needs arise between the sectors land, water and the environment (horizontal), but also between the central department of agriculture and the provincial and district offices (vertical) (see Table 4 for an overview).

Table 4: Action situation 3: Planning and licensing of (irrigation) projects

Project/investment	
Lead actor	Department of Agriculture (Ministry of Agriculture) for irrigation projects Department of Water Resources Development (Ministry of Water Development, Sanitation and Environmental Protection) for multi-purpose dams and groundwater extraction
Actors involved	Consultants, finance institutions, private construction firms, agri-business firms and farmers
Objective	Planning and authorisation of irrigation projects
Coordination	Data exchange between Provincial and District Offices Conditioned authorisation of investment license (land title, EIA and water certificates)
Issues/challenges	Duplication of activities (Department of Agriculture – Department of Water Resources Development) Capacity constraints of Department of Agriculture, and Provincial and District Offices
Source: Authors	

The planning of irrigation projects starts with the identification of the agricultural potential in the respective agro-ecological zone, based on the identification of suitable land sites (topography), on soil suitability and rainfall patterns (rainfall patterns, and not water availability, are the key characteristics on which these zones are delineated). The lead actor is the Department of Agriculture within the Ministry of Agriculture and its Technical Services Branch Irrigation whose decisions are informed by inputs from its provincial and district offices and on information (data) obtained from the Provincial Water Officer[14] and from WARMA on water availability. However, there is still no systematic collection of data everywhere to allow this soft coordination instrument – data exchange – to function effectively (as already mentioned, data on water availability and on water withdrawn are unreliable).

Interviewees expressed concerns about the institutional set-up: only a "department" of agriculture with a Technical Services Branch Irrigation is dedicated to irrigation development (Interviews Provincial Agricultural Coordinator (Ministry of Agriculture), May 2016). The number of staff of the Technical Services Branch Irrigation would appear to be too small to attract a pool of qualified engineers and to meet the growing demand for irrigation development in the country. The Irrigation Engineering Section in the Eastern Province, for instance, is operating at only 20 per cent of its staff requirement. Some of the field staff do not have adequate training and experience to handle large infrastructure projects. The lean structure and low staff levels in the Ministry have compromised the efficiency and effectiveness of this public-sector unit in carrying out its functions (in developing bulk water and irrigation infrastructure). Poor design and the lax supervision of contractors have sometimes resulted in dam breaks soon after commissioning.

Preparation of work plans begin at district level and then move on to provincial level. The national headquarters then consolidate these into a national document. The staff at national headquarters decide on irrigation projects in districts and coordinate with district staff, except for mega country-level projects. For instance, all the 27 irrigation sites that will be implemented under the Upscaling Smallholder Irrigation Project (USIP) (AfDB [African Development Bank], 2016) in nine provinces were selected by district-level staff and verified by provincial specialists. A similar method of coordination exists among district level staff of the Ministry of Agriculture and the Ministry of Water Resources Development, Sanitation and Environmental Protection.

The District Water Office and the District Agricultural Office follow their own separate plans and projects are approved at national level, with little or no coordination at district level (Interviews Zimba, 6 May 2016). Under the new decentralised administrative system planned, which has not yet been established,[15] all development activities at district level will be coordinated by a district commissioner.

14 The Provincial Water Officer is responsible for investigations, surveys, technical design of dams and the reading of gauging stations, and provides data to the Ministry of Agriculture for identifying dam sites.

15 The decentralisation process, led by the Decentralisation Secretariat under the Office of the President, is ongoing.

The provincial and particularly the district offices – both water and agriculture – are not in a position to fulfil the many duties they are officially assigned[16] (Interviews Zimba, 6 May 2016; Interviews Provincial Agricultural Coordinator (Ministry of Agriculture) and Provincial Water Officer (DWRD), Copperbelt Province, May 2016) because vacancies are not filled and positions have been frozen to satisfy World Bank conditions. Each District Agricultural Office is supposed to employ one irrigation engineer but rarely does; moreover there are not enough experts available on the market (Interviews Provincial Water Officer, DWRD, Copperbelt Province, May 2016).

Where the construction of bulk water infrastructure for the Farm Block Development Programme such as dams, weirs, canals, pumping houses, drilling of boreholes, and so on are concerned, the DWRD under the former Ministry of Energy and Water Development claims it is its mandate. Other ministries (would) forward their demands to this Department (Interviews DWRD Mpamba, 5 May 2016). However, according to the Water Resources Management Act of 2011 only the Ministry of Agriculture is mandated and receives financial resources from the treasury to construct dams and irrigation schemes for agricultural communities. On a number of occasions DWRD at district level has engaged dam technicians of the Ministry of Agriculture to survey, design, and supervise dam projects financed by the DWRD. Many dams constructed by DWRD are not provided with outlet pipes to enable farmers to draw off water for irrigation. As a result, no irrigation takes place downstream of such structures. When evaluated, the dams are assessed as being under-utilised.

Interviewees also criticised that WARMA's role as a licensing authority for water works was not always respected and that decisions on dam construction were not based on adequate information about who holds water-right certificates (Interviews WARMA Namayanga, 21 September 2015).

3.2.2 Action situation 4: Land acquisition and land titling

Since land is a key asset for investments in agriculture, actors in this action situation are concerned with land acquisition and land titling. The objective of decisions made in this action situation is the transfer of customary land titles to statutory land titles to provide security for investors. Only a positive transfer of a land title qualifies the title holder to apply for a water permit that is then processed and issued by the water authority, WARMA. Concerns here are the enforcement of rules vis-à-vis and by traditional authorities along with resettlement and compensation practices (see Table 5 for an overview).

16 The responsibilities of the National Office are: Fielding-in national and international consultants; reviewing and approving feasibility studies reports and detail designs; reviewing and approving national budgets for infrastructure development; recruitment and training of staff; and tendering of large projects. The responsibilities of the Provincial Offices are: Identification, review and preliminary approval of new projects and budgets from districts; preparation of designs for new projects; and facilitation of tendering of smaller projects. The responsibilities of the District Offices are: Identification of new projects and preparation of pre-designs; supervision of irrigation companies; and implementing contracts for infrastructure projects; training and providing advisory services on crop design, cultivation methods and water application.

Table 5: Action situation 4: Land acquisition and land titling	
Project/investment	
Lead actor	Commissioner of Lands (Ministry of Land)
Actors involved	Local councils and authorities, Zambia Development Agency, private investors
Objectives	Issuing land title (transfer from customary to statutory title) as part of the land acquisition process
Coordination	The Ministry of Agriculture liaises with the Ministry of Land to facilitate availability and accessibility of land for agricultural development Consensus for transfer required from village headmen and chiefs, applications to be approved by local councils
Issues/challenges	Inadequate information on land cultivated by local people, on boundaries and sizes of farm blocks Inadequate control over chiefs' execution of power and local councils' activities Public resettlement and compensation policy only as of October 2015, yet lack of operational guidelines to guide resettlement and compensation practices
Source: Authors	

The Land Act of 1995 was designed to provide investment security and open up land for private investors. Its main focus is the transfer of customary land to state/titled land (Brown, 2005), hence, the gradual expansion of titled land. The Land Act of 1995 vests all land in the President of the country "forever on behalf of all Zambians" (Land Act 1995, II., 3.1). However, the Land Act made it possible for land to be privately owned, bought and sold, and defined the procedures for acquiring leasehold tenure (Administrative Circular No.1, dating from 1985 (Adams, 2003, Appendix 5). The Land Act of 1995 allows the President to transfer land to non-Zambians who are permanent residents and to those non-Zambians who are approved investors within the meaning of the Investment Act of 1993 (Adams, 2003, p. 9).

The procedure depends on whether the area one wishes to cultivate and irrigate is on i) state land (former crown land) or, generally spoken, on land under statutory tenure, or on ii) land under customary tenure which covers the majority of Zambia's territory[17] and which is regarded insecure.

With regard to state or titled land, individuals and companies can acquire an inheritable 99-years leasehold title which allows the titleholder to manage land, lease, buy, sell, and use it as mortgage; titled land is subject to taxation (ground rent). The lease is expected to be automatically renewed if the conditions attached are not breached. Issuance of land title certificates is administered centrally by the Ministry of Land under the Commissioner for Lands.[18]

17 Sitko and Chamberlin (2016, p. 51): "The oft-quoted 94 per cent (of land under customary tenure) is not grounded in empirical evidence and is increasingly subject to criticism"; the figures date from Zambia's independence in 1964. Taylor assumes the figure to be "a political fiction. […] In fact, no one knows precisely how much customary land remains in Zambia, and no government has demonstrated sufficient intrepidity to conduct a land audit" (Taylor, 2017, p. 5).

18 For a historical overview on land policies, see Adams (2003), Brown (2005), and Tygesen (2014). Adams (2003) and Brown (2005) argue that land transactions do not take place according to market rules but according to state rules closely supervised and administered by bureaucracy.

If the land to be acquired is part of an officially designated farm block,[19] investors can directly approach the Zambian Development Agency which brought about one million hectares (Sitko & Chamberlin, 2016), or 500,000 hectares (Nolte, 2014), of former customary land under the control of its Land Bank to realise the Farm Block Development Programme. One such example is the land acquired by Global Plantations Ltd in the Luswishi Farm Block. Global Plantations Ltd now holds a leasehold title for 5,000 hectares (the land belonged to the Chiefdom of the Chief Shiwuchinga) and plans to acquire another 5,000 hectares. Due to government support (namely, the Zambia Development Agency), Global Plantations Ltd received the land title deed within three years, that is, "in a very short time" (Interviews Global Plantations Ltd, May 2016). In general, "the Ministry (of Agriculture) would liaise with the Ministry of Lands to facilitate availability and accessibility of land for agricultural development" (GRZ & Ministry of Agriculture and Co-operatives 2004, p. 10).

On customary land, which is recognised by the Land Act, land is neither titled nor subject to taxation. Allocation and use are governed by customary rules and by traditional authorities. Land is not owned but the members of a chiefdom enjoy permanent use-rights[20]; it can neither be sold nor rented out, nor can it be used as collateral. It is the chiefs that were granted administrative authority by the Land Act (1995) to allocate land ("[…] of incredibly large size" (Interviews Zambia Land Alliance (ZLA), 6 May 2016; see also Brown, 2005, p. 89)) to their "subjects" (Brown, 2005; Mamdani, 1996; Tygesen, 2014).

Government officials complain that land under customary tenure is outside the control of government; chiefs may negotiate with investors, sell the land in favour of serving their self-interest although this is an illegal practice[21]; they may even evict their "subjects" from the land. Contracts between these two parties – a chief and an investor – are binding, and there is nothing the government can do to protect its citizens. On one occasion, a chief gave 100,000 hectares to one of the largest mining companies ostensibly "for a song" (Interviews Shula, 4 May 2017). Chiefs have indiscriminately sold large tracts of land to local and foreign investors without giving due consideration to the demands of their "subjects".

If either a domestic[22] or foreign investor acquires land in areas under customary rule, that land has to be converted from customary to statutory tenure ("customary rights are extinguished and the land cannot be reconverted back to customary tenure" (Brown, 2005, p. 87)) where leasehold titles are issued for 99 years[23] through a formal licensing and registration procedure to be followed by individuals (also villagers) and companies.

19 Farm blocks are part of a large government-supported countrywide development programme.

20 Women lack access to land because the Land Act of 1995 recognises customary law. It recognises that the male head of a household is entitled to land. Women, regardless of their marital status or age, can never acquire land.

21 The land is actually offered in exchange for money (which may range from USD 5 per hectare to as much as USD 800 per hectare). The chiefs then issue Letters of Consent which enable project developers to obtain the title deed.

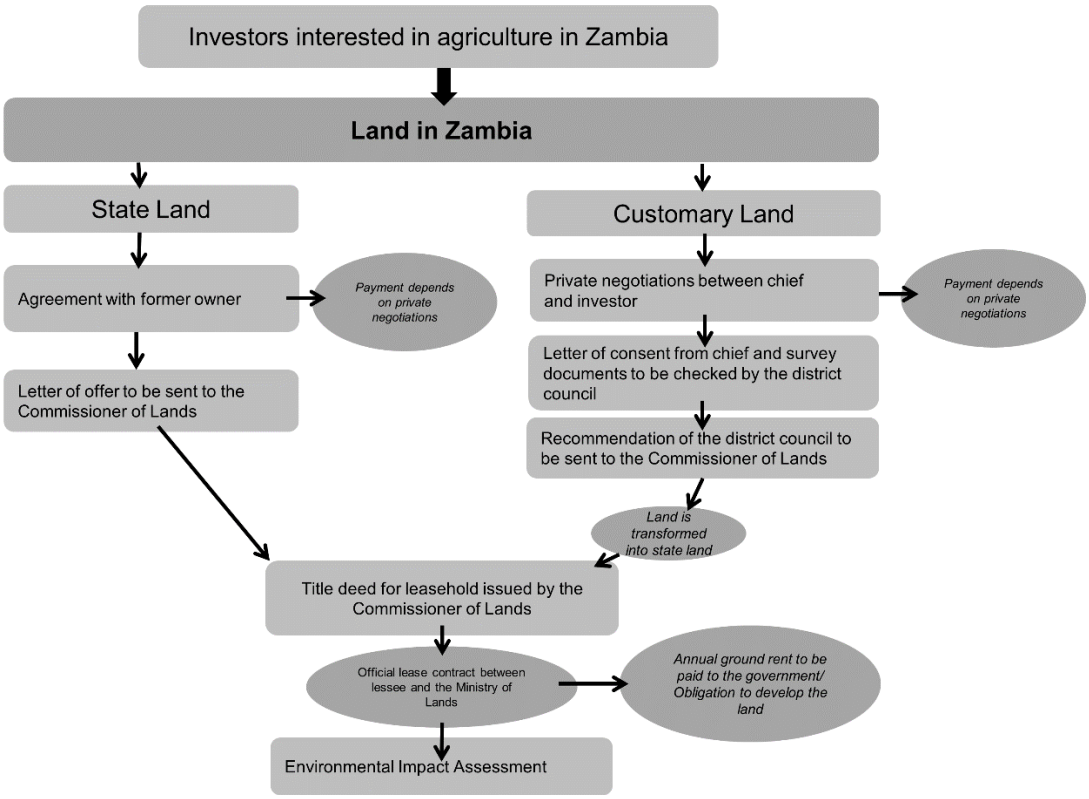
22 Recent research shows that local elites and the urban middle class acquire large tracts of customary land for speculative purposes (Sitko & Chamberlin, 2016; Taylor, 2015). "Eighty per cent of the applications for land conversions are just council staff applying for land themselves with which to speculate" (Brown, 2005, p. 100).

23 A provisional 14-years lease is possible on the basis of a sketch plan; upgrading to one of 99-years is difficult due to shortage of land surveyors meaning that 14-years title holder have limited tenure security (Adams, 2003, p. 149).

However, investors can approach chiefs directly and conclude either a private contract or a Memorandum of Understanding (Nolte, 2014, p. 700; Tygesen 2014, p. 45).

With the Land Act of 1995, the 286 chiefs of the country have become "the gatekeepers of new land to enter the (land) market" (Nolte, 2014, p. 700; Tygesen, 2014, p. 27; see also Brown, 2005, pp. 98-100). They can approve requests for tenure conversions (Brown, 2005, p. 98). Those who want to acquire land under customary tenure and convert it to titled state land must have the consent and approval of the chiefs (see Figure 3 on the formal procedure). Chiefs are limited to authorise the conversion of 250 hectares per transaction (transactions up to 1,000 hectares require the consent of the Minister of Lands; transactions of more than 1,000 hectares require the consent of the President, but consent is still required from the chiefs). The survey documents must be checked by the District Councils before the Commissioner for Lands can approve the transfer and issue the title. Local councils recommend the conversion of land to state land to the Ministry of Lands; the Registrar of Lands offers it to applicants. The successful developer hires a qualified surveyor to carry out a cadastral survey and submits the diagrams to the Ministry for approval. The Ministry then issues the leasehold title for 99 years.

Figure 3: Land acquisition and land titling process



Source: Nolte, 2014, p. 701

However, despite clear regulations, the role of District Councils is ambiguous: it is said that they undercount residents living and cultivating the land; that they do not inform investors that people are living there; and that they allow investors to clear land before an investor applies for approval of a project (Human Rights Watch's observations in the Serenje District, October 2017).

Although titled land registration is favoured and promoted by the government, registration is not easily accessible to all (Brown, 2005, pp. 90-92). It is "a lengthy and costly process" (UN Habitat et al., 2014, p. 14). One reason is the backlog of several years at the Ministry of Lands in handling applications; under current conditions many applications may never result in a title (Adams, 2003, p. 12). Other reasons why land transfer and title registration are not easily accessible is the tight control of land exercised by chiefs; that villagers are not aware of the official procedures; that transaction costs of conversion are high; and that a ground rent and taxes must be paid (Brown, 2005, pp. 88-90).

A Draft National Land Policy was ready in November 2002 but met with resistance from the chiefs who were afraid of losing authority and power which both rested on their control over customary land. Once land is converted, it ceases to be customary land and is out of the chiefs' control. As of December 2017, the National Land Policy was still in draft form and yet not finally agreed and adopted. However, after lengthy debates and consultations, the Draft document emphasises that "citizens will enjoy similar legal protection of rights and freedoms to own and transact land, whether or not they are on state land or customary land" (*Lusaka Times*, 1 March 2018). The House of Chiefs nevertheless rejected the Draft arguing "that the land policy is allegedly trying to tamper with the Chieftaincy" (*Lusaka Times*, 1 March 2018).

In the latest development, Zambia's government is considering reducing land titles for non-Zambians from 99 to 25 years (*Lusaka Times*, 17 March 2017). The move has been prompted by the rate at which land is being sold to foreigners although sale is an illegal practice. If left unchecked, it is feared that children will have no opportunity to take over and own land in the near future.[24] In areas near cities there has been high conversion from customary to leasehold which has then been offered to foreign investors, thus excluding villagers. A study in the village of Chibombo found that most villagers were now converting their customary land to leaseholds and that their land holdings were becoming smaller. The pecuniary advantage of selling land under the Land Act of 1995 is that it gives the rural land holders an opportunity to convert land holdings into cash. However, when such land is sold it is then converted from customary tenure to leasehold and becomes the exclusive use of the one who has bought and prompted the conversion. An analysis of this process suggests that, over time, communal land will be reduced to the extent that there will be very little land remaining as customary land.

The chiefs are not obliged to consult and gain consent from their "subjects". Chiefs may even expel and displace them. The non-governmental organisation Zambia Land Alliance (ZLA) is concerned about the displacement of entire communities and the inadequate, impoverishing compensation practices. Community members report that they are simply told to move out; they are not consulted and not informed by their chiefs; compensation is inadequate, and no clear rules exist in this respect or are not known by the communities (Interviews ZLA, 6 May 2016; see also Brown, 2005, pp. 92-94, 96-100).

Only in October 2015 did the Office of the Vice President decide on a Resettlement Policy Framework related to agricultural projects to address the "massive displacements" (GRZ &

24 Speech of President Edgar Lungu reported in the *Lusaka Times*, 17 March 2017. Ndola Town Clerk expressed his support for the move: "This should be taken as a well thought out policy, and this is what Zambians have been looking forward too" (*Zambia Daily Mail*, 22 December 2017).

Road Development Agency 2015, pp. 8, 19) that have taken place. Prior to this, there were no regulations concerning compensation for the people evicted from customary land (GRZ & Road Development Agency, 2015, p. 8).

According to the Resettlement Policy Framework, the Department of Resettlement under the Vice President's Office is responsible for identification and acquisition of land for resettlement; planning of schemes for voluntary settlement; demarcation of farm plots; processing applications from would-be settlers; allocation of farm plots to suitable applicants; recommending eligible settlers who can acquire certificates of title to their farm plots from the Ministry of Lands; coordinating provisions of infrastructure in the schemes; and managing the resettlement programme and resettlement schemes (GRZ & Road Development Agency, 2015, p. 15). The Department of Resettlement is responsible for coordinating and implementing the policy together with, for instance, ZEMA and ZDA (see Box 2). Coordination is to be realised through interagency committees to be formed from time to time at district, provincial and national level. Key stakeholder institutions are to be members of the inter-agency committees on resettlement whose chair will be the office responsible for resettlement. However, the public units concerned are in the process of being established and yet not fully functional.

Box 2: Functions of key institutions on resettlement according to the National Resettlement Policy of October 2015

The lead institution is the **Office of the Vice President** acting through the **Department of Resettlement**.

The **Ministry of Water Development, Sanitation and Environmental Protection** (the line ministry responsible for water development and for mitigating negative impacts deriving from projects) in liaison with the **Zambia Development Agency** provides information on population displacement and collaborates with the investor and the Office on the compensation and relocation of affected people.

The **Zambia Environmental Management Agency** solicits for comments on Resettlement Action Plans from the department responsible for resettlement and other key stakeholders and incorporates conditions in the decision letter to the developer/investor. ZEMA also issues Social Impact Studies as part of the Environmental Impact Assessments for major projects.

The **Zambia Development Agency** liaises with the Department of Resettlement and other key stakeholders prior to the issuance of the investment license for development projects that may lead to the displacement of people. ZDA ensures that investors are responsible for the resettlement/relocation, the rehabilitation and compensation of the displaced persons in the case of developmental projects in accordance with the existing laws; it ensures that investors in consultation with the relevant government departments engage with the affected communities through a process of informed consultation and participation. Also, in collaboration with investors, it identifies alternative land for resettlement and provides housing and other infrastructure and supports livelihoods restoration including marketing in the area of resettlement.

Source: GRZ & Road Development Agency, 2015

3.2.3 Action situation 5: Environmental authorisation

Prior to the licensing of irrigation projects by the authorising agency and prior to the processing of and decision-making on water permit applications by the water authority, WARMA, actors in this action situation facilitate and manage the assessment of environmental (and social) impacts and decide on a project's environmental clearance. Only with an environmental clearance document will a project developer receive the right to use water as specified in a water permit and to start with the construction of water works.

Issues relate to the assessment and mitigation of social impacts and the timing and quality of EIAs (see Table 6 for an overview).

Irrigation projects are only approved if they are environmentally compatible. Water permit applications are only processed and finally decided by WARMA with an environmental clearance document. Only then will the authorising agency issues the investment license which signals the start of project implementation (Interviews ZEMA, 9 October 2015).

An Environmental Impact Assessment (EIA) has been a statutory instrument since 1997 when the EIA Regulations came into force (Statutory Instrument, SI, No. 28, 1997). The Regulations rule that some projects are only subject to Environmental Project Briefs[25] when it is assumed that the negative impacts on the environment will be very low (ECZ [Environmental Council of Zambia], 2013, p. 9). However, the irrigation projects under consideration are all subject to a full EIA since these projects are likely to have significant impacts on the environment.[26] The EIA Regulations apply to any project, be it public or private, domestic or foreign.

ZEMA is a statutory body set up in 1997 (renamed in 2011 by the Environmental Management Act No. 12 which is now under the Ministry of Water Development, Sanitation and Environmental Protection) and the lead agency on any matters related to EIA. ZEMA is entitled to issue environmental authorisation for a project. The procedural rules as defined in the EIA Regulations refer to international standards related to the issues to be considered,[27] the steps of the EIA procedure (such as screening or scoping), public consultations, and participation of potentially affected and interested parties although there is a lack of specific guidelines for public participation. Further, both the full EIA reports and the Environmental Management Plans, which are mandatory, are disclosed and publicly accessible on ZEMA's website (http://zema.org.zm//document details).

ZEMA staff appreciate EIA as a "valuable planning tool" that is increasingly being recognised and used. For instance, the Zambia Development Agency meanwhile officially informs investors about EIA. It is also proactively used by the public: investors who have started the project without environmental clearance were sued and brought to court upon public complaints (Interviews ZEMA, 11 May 2016).

However, ZEMA staff criticise the inadequate baseline data that are particularly weak regarding soil and groundwater surveys. It also occurred that not all downstream impacts are assessed (this was the case at Mulungushi Dam: land was opened up for irrigation upstream of the dam and a water permit was granted that affected the dam); and that guidelines for Statutory Minimum Flows have not yet been developed. Overall, the EIA only applies to projects, while in many cases activities go beyond irrigation infrastructure projects towards road construction, grid connection, and so on (Interviews ZEMA, 11 May 2016).

25 For instance, "(11 f) land consolidation and (12 f) projects in or near to environmentally sensitive areas)" (ECZ, 2013, p. 10)

26 These projects are "(a.) land clearance for large scale agriculture" and "(d.) irrigation schemes covering an area of 50 hectares or more" (ECZ, 2013, p. 15).

27 Issues to be considered in an EIA are listed in the EIA Regulation (Part Five) and comprise: i) ecological considerations, ii) social, economic and cultural considerations, iii) landscape, iv) land use, v) water, and vi) air quality (ECZ, 2013, EIA Process in Zambia: Part Five).

Prior to issuing environmental clearance, ZEMA invites comments from other public stakeholders (Ministry of Energy, WARMA, Ministry of Finance, etc.) to validate the EIA, and particularly from the authorising agency, and only grants its approval upon their consent and if adequate mitigation measures are proposed.

While the increasing number of EIAs implemented has been positively highlighted (Interviews ZEMA, 11 May 2016), the capacity bottlenecks at the provincial level negatively impact on the quality of EIAs (due to a lack of manpower and the strict time schedule, the time pressure for conducting and processing EIAs is high) and on monitoring the implementation of environmental management plans. The long-term solution is the establishment of Regional Offices equipped with adequate and sufficient staff: at present Regional Offices exist in the Northern Region, Livingstone and Chirundu Border (Interviews ZEMA, 11 May 2016).

Moreover, according to a Human Rights Watch report, consultants implementing EIAs are not formally registered and certified which affects the quality of EIAs. EIA reports are not fully catalogued or systematised, and only a small number are available on ZEMA's website. ZEMA has no oversight of whether a project has an EIA and lacks a systematic tracking of the failures of companies to submit EIAs (Human Rights Watch, 2017).

At present, ZEMA officially has to assure that the social impacts of projects are adequately dealt with. Social Impact Assessment studies and Resettlement Action Plans are one component of the EIA procedure for which ZEMA is responsible. ZEMA solicits comments on Resettlement Action Plans from the department responsible for resettlement and other key stakeholders and then incorporates comments into the decision letter to the developer/investor as conditions (GRZ & Road Development Agency 2015, p. 35). It finally approves Resettlement Action Plans that are submitted by the project developer, and it is intended to monitor whether project developers comply. It is intended to assist the project developer to perform public consultation process and hearings which are mandatory if resettlement issues arise (see the Lusitu and Mwomboshi irrigation schemes) (Interviews ZEMA, 11 May 2015).

If physical relocation of people is likely and if the project may have an effect on the livelihoods of people who live, work or are otherwise affected, the project developer has to negotiate and enter into agreements with the families and pay compensations (the agreement must be handed over to the Attorney General),[28] but formal compensation guidelines have yet to be developed to operationalise the new Resettlement Policy. There is little guidance for ZEMA on what constitutes an acceptable resettlement action plan, and it is questioned whether ZEMA should be assigned this role. Above all, there would be no clear-cut procedures for resettlement and compensation (Human Rights Watch, 2017). Prior to the new resettlement policy of 2015, the affected people depended on negotiations between project developers and chiefs but were supported by extension officers of the Ministry of Agriculture "who were invited" to estimate the value of the land, of crops and houses. Overall, it would therefore appear that social impact assessments are carried out late instead of being part of the land titling process.

28 One example is Silverlands Zambia Ltd (SZL): "SZL will put up an effective grievance management mechanism […]SZL has entered into agreements with the families so as to ensure that the two parties work together and that no other people settle on the property" (Silverlands Zambia Ltd, 2014, p. v).

As a last step, if an EIA is approved, ZEMA communicates its decision to WARMA and to the authorising agency (that is, the Ministry of Agriculture for irrigation projects).

Table 6: Action situation 5: Environmental authorisation	
Project/investment	
Lead actor	Zambia Environmental Management Agency
Actors involved	Project developer, authorising agency, community in project area
Objective	Managing EIA and issuing environmental clearance document Monitoring environmental management plans Approving and monitoring implementation of Resettlement Action Plans
Coordination	EIA procedure Ministries concerned are represented in EIA commissions Specific comments to EIA from authorising agency Public hearings with project affected people and interested parties WARMA only issues and approves applications if environmental clearance document is provided
Issues/challenges	Lack of operational guidelines for Statutory Minimum Flows of rivers Inadequate baseline studies (soil, groundwater), inadequate assessment of downstream and social impacts Capacity constraints of headquarters and provincial offices affect EIA quality and monitoring of Environmental Management Plans Lack of guidelines for resettlement and compensation policy Timing of social impact assessments
Source: Authors	

3.2.4 Action situation 6: Approval of water permits

This action situation comprises actors involved in processing and approving water permits, the final stage before an irrigation project is authorised and before the project can start implementation. Here, formal links exist to the action situation "Land Titling" and action situation "Environmental Authorisation". Issues relate to the yet ongoing process of establishing effective water management institutions and of putting in place a fair, transparent allocation regime (see Table 7 for an overview).

Zambia's parliament set in motion reforms in the water sector following the Water Resources Management Act, enacted in April 2011, which is binding for everybody. These ongoing reforms affect existing (agricultural) water users and the licensing and implementation of planned irrigation projects. At the core is a new water allocation regime[29] converting the inflexible, infinite water rights system (Water Act, 1949) into the more flexible instrument of water permits. The rationale behind this change is to enable the

29 "The term 'allocation regime' embraces the combination of policies, mechanisms, and governance arrangements (entitlement, licenses, permits etc.) and determines who is allowed to abstract water from a resource pool, how much may be taken and when, as well as how much must be returned (of what quality), and the conditions associated with the use of this water" (OECD, 2015, p. 19). An allocation regime can manage the risk of water shortage and adjudicate between competing users.

regulatory body to respond flexibly to changing demand patterns and changing water availability resulting from climate change or El Niño.

Only commercial water users have to apply for water permits (see Box 3). A water permit, which is not tradable, requires either a land title deed certificate or a letter of consent from the traditional authority or chiefs on the land transactions that had taken place. WARMA, the lead agency for any matters on catchment-based management of the country's water resources, only proceeds and decides on water permits if a project developer possesses a land title identifying him as an eligible water user. In turn, the Board of WARMA only issues a water permit if a project developer hands in an environmental clearance certificate from ZEMA, in accordance with the Environmental Management Act of 2011.

Box 3: Key information on water permits

Only *commercial* water users have to apply and be registered. However, the cut-off point between non-commercial and commercial water users is debated and will be defined in a bye-law. Should the threshold be volume of water used or area irrigated? Should the limits also depend on the level of water stress in a catchment?

Water permits are not tradable. A water permit is needed for surface and groundwater, for water used on land under customary tenure (prior to the new Water Resources Management Act, groundwater-use rights were linked to land-use rights, and no application was needed), and for dams impounding a reservoir in excess of 10,000 cubic meters.

Smallholders, households, and cattle-herders enjoy priority as do Environmental Flow Requirements (together, they build the Reserve), yet no operational guidelines exist.

Water permits specify the source, amount, purpose, and duration (25-30 years for hydropower projects; 20-25 years for mining; 5 years for agriculture and industry, 25 years for municipal utilities).

Periodic review defined renewal approval intervals in order to adjust demand to availability.

New Water Pricing Regulations are in the making (no charges for non-commercial users).

WARMA is the regulatory agency (manages licensing procedure).

Source: GIZ & BGR [The German Federal Institute for Geosciences and Natural Resources], 2015; Water Resources Management Act 2011

The Water Resources Management Act rules that any person who intends to construct and install any water works or drilling, to withdraw water or discharge substances into water bodies, must notify the catchment councils (where they exist) and every occupier of riparian land, and must obtain approval of the traditional authorities. Water permits assigned[30] to commercial users[31] would specify the source, the purpose and the amount of water that can be withdrawn, taking due consideration of minimum flows to be maintained after withdrawal, the duration of the permit (finite, subject to renewal) and the conditions for cancellation. Furthermore, the Water Resources Management Act prioritises domestic, non-commercial use over commercial utilisation, and rules that a reserve – comprising priority uses and environmental flow requirements – has to be set aside.

30 An applicant has to provide information on area(s) to be irrigated, source of water, crop details, growing period, assumed crop irrigation demand, irrigation technology to be used, monthly irrigation quota, annual volume required, and peak daily requirement.

31 Applicants do not need to be the property owner, but the owner's permission is required.

Water permits are decided upon by the Board of the Water Resources Management Authority (WARMA) in which all relevant ministries (Permanent Secretaries of the ministries of Mines, Local Government and Housing, Agriculture and the Commissioner of Lands) and the private sector are represented. Prior to deciding on applications, WARMA must consult with traditional authorities and has to consider existing water entitlements.

Ideally, authorisations should be based on water balances and water management plans together with allocation plans for specific river catchments (or sub-catchments). However, there is a lack of water balance studies, and management and allocation plans for most catchment areas (as of May 2016, they were in the making for the Kafue, Luangwa and Zambesi rivers) due to a shortage of data. The 600 manual gauging stations are located mostly on big rivers only, and are either non-functional or have no gauge readers. Moreover, information available about water rights allocated by the former Department of Water Affairs and the volume of water actually used is inaccurate and unreliable. The data for groundwater is even more insecure (Interviews WARMA Namayanga, 21 September 2015).

Catchment management plans are relevant coordinating planning instruments because they are developed on the basis of detailed assessments of national and regional development plans and other activities which have an impact on water and related resources (land) in the respective catchment. Hence, they would be able to provide an overview of conflict areas as well as potentials (Interviews GIZ Zambia, March 2018).

The biggest challenge for WARMA is guiding the transfer from the water rights system to water permits (Regulations for Water Permits have yet not been enacted (Interviews WARMA Kampata, 18 May 2016)), particularly in river catchments where the former Water Development Board (under the Department of Water Affairs) has over-allocated water and issued certificates (water rights allocation was seen as an administrative act only and not as a management instrument). The notification of present certificate holders has already been a challenge: at present (May 2016) only about 400 water-rights holders have been notified out of an estimated total of more than 10,000 (Interviews WARMA Namayanga, 21 September 2015).[32]

During an interim transfer period, water permits are granted for one year only which has met resistance from existing water rights holders. Even so, the envisaged duration period of five years for agricultural users is regarded a plain disincentive for investors due to the prohibitive costs incurred for land development, on-farm infrastructure investments such as irrigation equipment, farm roads, and construction of processing facilities (Interviews Chief of Farming, Global Plantations Ltd, May 2016). While land titles are assigned for 99 years (or 14 years), it is only 5 years for a water permit.

32 "It is important to note that water rights are not fully up to date because users have failed to report changes or reapply for extension and because the (former) Water Board has been unable to fully monitor water use […] measurements on water use are scarce and information on actual use is therefore not available. However, from seasonal users such as irrigators, total use can be assumed to be considerably lower on an annual basis than the total water rights allocated" (Mazabuka Municipal Council, 2013, p. 60). The authors of the report assume that, for instance, the Nakambala irrigation scheme (Zambia Sugar Ltd) is capable of expanding another 10,400 hectares of irrigated land at the current system of operation efficiency (Mazabuka Municipal Council, 2013, p. 61).

Table 7: Action situation 6: Approval of water permits	
Project/investment	
Lead actor	Water Resources Management Authority (regulatory agency)
Actors involved	Catchment Councils, Water User Associations, water users
Objective	Issuing water permits (sustainable development of water resources and balancing water use across sectors)
Coordination	Relevant ministries and private sector representatives on WARMA Board decide on applications based on attached title deeds or letters of consent from traditional authority or Chiefs Obligatory consultations with local authorities (chiefs, local councils), approval by Catchment Councils Approval by WARMA Board only with environmental clearance document from ZEMA
Issues/challenges	Managing transition period of setting up new water institutions and enacting new directives Unreliable data (rainfall, water availability, water rights allocated, actual amount of water utilised) Water balance studies, management and allocation plans including water reserves and allocable water are available only for some catchments
Source: Authors	

Present commercial water-rights holders are concerned about the re-allocation of water entitlements arguing that they have invested in infrastructure (dams) based on the water rights assigned (Interviews Stacey, 24 September 2015).[33] They complain that guidelines from WARMA are missing on whether the principle of prior appropriation applies (seniority); on how the principle of equitable utilisation is translated in the case of competing claims (Interviews Stacey, 24 September 2015); on how to deal with situations where less water is used than the certificate assigns (Interviews GIZ Thombansen, 21 September 2015), and on what arrangements are particularly foreseen for periods of drought (Interviews Zambia Sugar Nakambala Estate, 2 October 2015).[34] Regarding the many non-commercial users, it is not clear what mechanisms WARMA will introduce to protect their use-rights (van Eeden, Mehta, & van Koppen, 2016).

WARMA's parastatal status alone is a challenge: it is only temporarily under the Ministry of Water Development, Sanitation and Environmental Protection but ought to be financially autonomous in the long run. WARMA staff are not civil servants, and WARMA is not eligible to receive its budget from the government. The current funding by the government is an exit strategy and is temporary with the aim of getting the institution established so that it can be a standalone unit as ruled in the Water Resources Management Act 2011. Its source of financing are water fees (membership fees of water user associations; water fees as a percentage of the produce sold) which might be a viable solution in economically developed catchments but not in catchments with low economic activities. Hence, solutions have yet to be developed.

33 Based on water rights assigned, farmers have privately financed the Masebe Dam without public contributions (Interviews Stacey, 24 September 2015).

34 It is discussed to adjust and change water permits in case of long enduring drought periods; in other cases, Water User Associations (WUA) might reduce water supply proportionally without effects on registered water permits (Interviews Beuster & Nyumbu, 19 May 2016).

Whether the new water allocation regime develops in the long term into an effective coordination instrument depends primarily on whether WARMA is able to carry out its mandate and whether the units planned at catchment level are set up and become functional; it also depends on whether WARMA and the catchment units will be equipped with sufficient financial sources.

4 Conclusions

Our analysis has focused on the water-land based agricultural development projects and the irrigation sub-sector because it concerns the utilisation of two critical natural resources: land and water (the water-land-food nexus). The Zambian Government's vision of developing this section of agriculture rests on the assumption that land and water are still underutilised in some regions; the government promotes development by inviting (foreign) investors and by linking smallholder farms to established value chains and stable markets.

Since planning and implementation of agricultural water-intensive projects does not only take place in the sphere of land and water policy, we have defined *action situations* to account for the many adjacent decision-making arenas relevant to water-land based investments in agriculture. We have not analysed the physical – the resource – dimension but the institutional relationships between the action situations and the governance arrangements within.

Our analysis of the water-land-food nexus in Zambia has shown that this two-dimensional nexus already forms a highly complex setting. We will now summarise our findings related to the existing coordination modes (subsection 4.1.1), the kind of coordination challenge (subsection 4.1.2), and the barriers that hinders coordination and integration of social and environmental aspects (subsection 4.1.3). After that, we will then finally discuss governance gaps beyond coordination challenges (subsection 4.1.4).

4.1 Coordination modes at hand at the national and the project level

Zambia has a coordination structure in place that allows all ministries' activities to be directed towards developing the country's under-utilised land and water resources and achieving the objectives set. These are sectoral goals but require coordination with adjacent public-sector units other than agriculture, namely land, water and the environment.

The National Five-Year Development Plans are the overarching binding documents and as such act as a coordination mode promoting the Zambian Government's vision of a commercialised agriculture that would increase production and productivity, reduce poverty and support the creation of jobs, among other things. The National Development Plans are the result of negotiations and consultations and incorporate inputs provided by public stakeholders such as the line ministries, provincial and district coordinating committees, the private sector, civil society, traditional authorities and finally WARMA and ZEMA, representing water and environmental issues. Hence, they are expected to coordinate the activities of the ministries and public units that are involved in realising the government's vision. Recently, the government has announced that it will apply an integrated (multi-sectoral) planning approach, rather than a sector-based one, and has devised *clusters* as new coordinating units.

The National Development Plans work towards "positive coordination" (Scharpf, 1993a; 1993b), that is, building policy coherence. This applies to their procedural dimension as well as to their functional character. The Irrigation Policy and Strategy translates the national vision into development targets for the sub-sector, and corresponds with the targets of the National Agricultural Policy. Both policy documents – irrigation and agriculture – are developed under the aegis of the Ministry of Agriculture, with contributions provided by the water authority, WARMA, and the environmental agency, ZEMA.

An inter-sectoral planning group (horizontal coordination) has been set up to overcome infrastructure deficits for large-scale agro-investments including water works (but not for small-scale irrigation schemes), thus removing disincentives for investors.

The sequenced licensing procedure formally links and coordinates decisions between action situations: A project license is only approved if the project developer holds a land title; the approval of a water permit relies on the land title, and a water permit is only processed and approved with an environmental clearance document. Each individual step requires compulsory consultations with local authorities, both traditional and modern, and authorisation/approval by the Attorney General is based on their consent. However, this procedure is not always strictly followed.

Ministries are represented on, for instance, the Board of WARMA, co-deciding on water permit approvals, carrying veto power; participatory procedures are mandatory and part of the process of assessing environmental impacts, and in case of involuntary resettlement and relocation of people.

Table 8: Coordination within and across action situations

	Inter-ministerial commissions	**Consultations with/consent required from**	**Representation/ participation**	**Data exchange**
National level				
Action situation 1: National Development Plans		X	X	X
Action situation 2: Policy, strategy of irrigation	X	X		X
Project level				
Action situation 3: Irrigation project planning and licensing		X		X
Action situation 4: Land acquisition and land titling		X		
Action situation 5: Environmental authorisation	X	X	X	X
Action situation 6: Water permit approval		X	X	X

Source: Authors

Access to and exchange of available data act as soft coordination modes, and exist at every level. Table 8 shows the diverse coordination modes applied.

However, the information collected does not allow a clear-cut assessment on whether coordination is either positive or negative.

4.2 Coordination challenges

Now, we briefly summarise the coordination challenges identified and mention a few illustrative examples.

Redundancies (a duplication and/or overlapping of responsibilities)

The responsibilities and functions of the Department of Water Resources Development (DWRD) (Ministry of Water Development, Sanitation and Environmental Protection) and the Department of Agriculture (Ministry of Agriculture) regarding the construction of water infrastructure are not clearly separated.

Lacunas (gaps and/or lack of regulation)

There is a lack of operational guidelines and directives, rendering formally prescribed coordination modes non-functional. This does not only refer to operational guidelines for environmental issues (statutory minimum flows of rivers) but also to making the water allocation regime functional (operationalising the principles of prior appropriation and equitable allocation; water allocation rules during drought periods), and to resettlement and compensation practices.

Incoherencies (contradictions in policies and implementation measures)

Zambia, like other countries in sub-Saharan Africa, has both a modern and a traditional land-tenure system that exist in parallel. This creates conflicts between the modern state apparatus and the traditional land governance institutions. Contradictions also exist between the land and water regime: land titles are approved for 99 years, while the duration period for water permits for commercial water users lasts only 5 years for agricultural projects, even if costly storage and distribution facilities have to be built.

4.3 Barriers and hindrances to effective cross-sector coordination and integration

Now, we finally summarise our findings regarding the barriers to coordination and integration.

- The implementation of prescribed, mandatory modes of coordination is incomplete. This applies to the sequenced licensing procedure of irrigation projects. Procedures are not always strictly followed due to constraints in capacities and the lack of adherence to prescribed rules.

- Good coordination depends on the availability of data and information. While in some instances data are incomplete and unreliable, in others they are actually withheld. This not only applies to data on water (availability, allocated water rights, water actually utilised,

and so on) but also on the demarcation of farm block borders and farms, as well as on the people residing and cultivating the land.

- Good coordination requires both technical and administrative capacity. Constraints in capacity exist at the level of line agencies as they do at provincial and local levels. In the Department of Agriculture, irrigation is only a 'Section' and has only four staff positions at national headquarters. The Provincial and District Offices of Agriculture (Department of Agriculture) and Water (Department of Water Resources Development) are understaffed and underfinanced making vertical coordination almost impossible. Likewise, environmental management suffers from the capacity constraints of the environmental offices.

- Effective coordination requires stable, functioning institutions: While the new water allocation regime has the potential to become one effective coordination mechanism to balance water use(r)s, reforms are ongoing and new water management institutions (catchment councils, water user associations) do not yet exist everywhere. Water availability assessments, water rights allocations, catchment management plans and statutory instruments are currently in the making. As of now, a mechanism is lacking to protect the water use-rights of the many non-commercial water users (their use-rights are not registered; they do not have to apply for a water permit).

- With regard to land acquisition and land titling, the modern state apparatus is inadequately "aligned" with the traditional land-tenure governance institutions. This can be described as a coordination challenge that originates from the plurality and concurrency of traditional and modern land-tenure systems. However, it is as much a matter of political power and the legitimate bases of two centres of authority.

- While there is a lack of effective control by local councils (in which traditional authorities are represented – usually the headpersons of the villages), these local councils are also not strongly enough controlled by the respective regulatory authorities who themselves lack adequate institutional capacity to fulfil their functions. It seems that stricter political oversight over land acquisition and land titling processes is needed – and the role local councils play – to better comply with legal requirements. However, a challenge is how to incentivise chiefs to play a greater role in spearheading development in their areas.

4.4 Governance gaps beyond coordination challenges

This study has shown that governing the water-land-food nexus is not only a cross-sectoral – horizontal – coordination issue but also an issue of effective vertical coordination.

Effective implementation of the Zambian government's vision for the agricultural sector is also an issue of assigning distinct functions and power to public sector units and equipping them with sufficient means to implement plans. It is also a question of upgrading public units to become fully fledged administrative units (especially the Technical Services Branch Irrigation) and of considering viable financial models (WARMA), among other requisites.

Whether the new ministerial landscape improves or hinders coordination is unclear and ought to be researched.[35]

Good coordination with all its facets is a tremendous governance challenge for the Zambian Government and defies simple solutions. In addition, coordination is not the only governance gap Zambia has to tackle.

It is evident from our analyses that governance gaps exist beyond (both horizontal and vertical) coordination and critically influence the environmental and social viability of projects in particular. The integration of environmental and social aspects into project planning and authorisation requires particular political attention in order to render investment projects sustainable right from the outset.

5 Recommendations

In the following section, we put forward recommendations to improve coordination and, beyond this, recommendations on governance issues.

Strengthen the project licensing procedure by improving the knowledge base. This could be done by developing joint data banks or separate, but mutually accessible, data banks. These could contain information on the demarcation and size of farm blocks and of individual farms; on people living in the area and holding either informal or formal land-use rights; on applications for land titles and water permits, as well as on the approval of applications; on environmental clearance documents as well as on water permits allocated and the reserve to be maintained (water for non-commercial users, statutory minimum flow requirements).

To improve the transparency of the social impacts of water-land based investment activities, a binding procedure could be introduced: the Ministry of Lands could notify ZEMA and the Department of Resettlement about land titling applications that will require resettlement and compensations of residents.

It would be important to review whether the timing and locus of social impact assessment studies are adequate to influence the decision-making of projects at a stage when necessary corrections can still be made.

Harmonise land- and water-rights entitlements to provide security for investments (both small and large) taking account of the public goods characteristic of the resources. While land titles are approved for 99 years, the duration period for water permits for commercial water users lasts for only 5 years for agricultural projects. This clear disincentive should be reviewed and eliminated by the respective authority.

35 The key term in the Nexus debate is *cross-sector* coordination, but what is to be understood by "sector", is not straightforward. The economic three-sector theory relates to the primary, secondary and tertiary sectors. The term can also embrace sectors such as forestry, agriculture, trade and so on, while sectors can be public or private actors. The way the term is used in the nexus literature however relates to mandates officially assigned to a public (-sector) unit. The recent restructuring of the ministerial landscape shows that "sectors" are flexible, constructed entities, and may changes as fits better coordination – but also to allocate/reallocate power.

Introduce a mechanism that protects the water-use rights of non-commercial water users vis-à-vis commercial water users. Since non-commercial water users do not have to apply for a water permit, their use-rights are formally not registered and may not be legally recognised.

Develop operational guidelines to make coordination effective and to effectively integrate social and environmental issues. This relates to guidelines for the Strategic Environmental Impact Assessment; Statutory Minimum Flows of rivers; the participation procedure in the EIA process; the operationalisation of the principles of prior appropriation and equitable allocation; decisions on water allocation rules during periods of drought; and – above all – resettlement and compensation.

Remove institutional and capacity constraints by upgrading the Technical Services Branch Irrigation to a Department; by improving the staffing and financing of the Provincial and District Offices of Agriculture and Water; by supporting WARMA and the catchment organisations to become fully functional; by continuing to improve environmental management (assessments, monitoring) by alleviating the capacity constraints of the environmental offices.

Accelerate the establishment of water management institutions: The new water allocation regime has the potential to become an effective coordination mechanism to balance water use(r)s. However, reforms are ongoing and new water management institutions (catchment councils, water user associations) do not yet exist everywhere. Water availability assessments, allocated water rights, catchment management plans and statutory instruments are in the making.

Facilitate research on the recently set-up ministerial landscape to improve coordination. In October 2016, ministries were split up (the Ministry of Agriculture and Livestock was split into the Ministry of Agriculture and the Ministry of Livestock and Fisheries) and a new water ministry was created − the Ministry of Water Development, Sanitation and Environmental Protection. Whether the recent restructuring of ministries contributes to the effective implementation of government programmes and improves coordination in all directions necessary is a matter of empirical research. It would be a trend-setting decision of the Government of Zambia to facilitate and promote research on this topic, as well as on how to better align development with social and environmental objectives, and the traditional with the modern state apparatus.

Existing functions should be reviewed: At present, social impact assessments are part of the EIA procedure with ZEMA taking the lead. ZEMA should also assist investors to hold public hearings and to develop Resettlement Action Plans. Moreover, ZEMA is the agency to approve Resettlement Action Plans and to monitor compliance with conditions attached to clearing documents. One should investigate whether ZEMA is adequately staffed to assess and monitor social issues and whether these functions (of assessing and monitoring) should be split up and assigned to separate entities.

Review the organisational model of WARMA: The Water Resources Management Act declares that WARMA, as the regulatory authority, should be financially autonomous. However this is proving difficult to achieve. It would be important to review and learn from international practices on how to strengthen WARMA in its role as regulatory agency and to develop solutions for a viable financing model.

Coordinate the modern and traditional systems of land governance: It would be worth studying international experience of how to better align traditional with modern land-tenure systems so as not to deprive users of customary land of their (land and water) usage rights because they do not have a formal land title.

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Annex

Table A1: List of interview partners and experts consulted

2015	Name	Affiliation	Position
21 September 2015 March 2018	Conrad Thombansen and colleagues	GIZ Zambia, Lusaka	Programme Director
21 September 2015	Christof Sonderegger	GIZ Zambia, Lusaka	Deputy Programme Director
21 September 2015	Lemmy N Namayanga	WARMA	Deputy WARMA
22 September 2015	Stephan A Neu	Kreditanstalt für Wiederaufbau (KfW)	Country Director
23 September 2015	Hans Beuster and Inyambo L Nyumbu	GFA – GIZ Climate Change Project	Team Leader, Deputy Team Leader
24 September 2015	Don Stacey	Masebene farm	Farm Owner-Manager
25 September 2015	Tobias El-Fahem and Andrea Nick	BGR	Project leader Project staff
25 September 2015	Ellah Chembe	Zambia National Farmers Union	Deputy Executive Director
28 September 2015	Emmanuel Nyirenda	Ministry of Agriculture	Principal Irrigation Engineer
30 September 2015	Inyambo L Nyumbu	GFA – GIZ Climate Change Project	Deputy Team Leader
31 September 2015	Elke Praagman	WWF, Programme – Freshwater	Young Expert
2 October 2015	Bruce Meikle, Sudan Mulebwente, Anthony H Domleo, Hephzibah Beyani	Zambia Sugar Ltd, Nakambala Estate	Managers for water, agriculture, and smallholder development
6 October 2015	Priscilla Dinga	Zambeef	Area Manager (Safety Health, Environment and Quality)
9 October 2015	Konstantino Mwembela and Charity N Mundia	ZEMA	Senior inspectors
8 October 2015	George Phiri	USIP, Ministry of Agriculture	National Coordinator
4 May 2016	Reynolds K Shula	Ministry of Agriculture	Principal Agriculture Specialist
5 May 2016	Dr H Mpamba	Department of Water Resources Development	Director
5 May 2016	George Phiri	Upscaling Smallholder Irrigation Project, Ministry of Agriculture	National Coordinator
5 May 2016	Imasiku A Nyambe	University of Zambia, Water Sector Advisory Group	Professor, Director of Directorate of Research & Graduate Studies
6 May 2016	Henry Musonda Zimba	University of Zambia	Postgraduate student

6 May 2016	Hon. Given Lubinda	Ministry of Agriculture	Minister
6 May 2016	Nsama N Chikolwa and colleagues	Zambia Land Alliance	Executive Director
6 May 2016	Gift Sikaundi and Felisitus Mgulube	ZEMA Northern Region Office	Principal Information Systems Officer, Engineer
9 May 2016	Kelvin Kaira Arthur Chityamba	Manyonyo Smallholder Irrigation Scheme	Irrigation Engineer Agronomist
9 May 2016	Muimui T Mufana and Christopher Kaonga	KASCOL	Estate manager Finance manager
9 May 2016	Anthony Domleo	Zambia Sugar Ltd	Agriculture manager
11 May 2016 16 May 2016	Bishop Dr Ed Chomba	Ministry of Energy and Water Development	Permanent Secretary Water
11 May 2016	Alfred S Sakwiya	Office of the President, Cabinet Office	Director
11 May 2016	Charity Mundia and Konstantino Mwembela	ZEMA Headquarters	Senior inspectors
12 May 2016	Lushi Kanda	Ministry of Agriculture	Provincial Coordinator, Section Irrigation Engineer
12 May 2016	Peter Akeebu	Lufwanyama District Agricultural Office	Irrigation Technician
12 May 2016	Lushi Kanda	Ministry of Agriculture and Livestock	Provincial Agricultural Coordinator
12 May 2016	NN	DWRD, Copperbelt Province	Provincial Water Officer
13 May 2016	Imasiku Liayo	Global Plantations Ltd	Chief of Farming
18 May 2016	Jonathan M Kampata	WARMA	Principal Water Resource Engineer
18 May 2016	Paul C Kapotwe	WARMA	Director General
19 May 2016	Christof Sonderegger	GIZ	Deputy Programme Director
19 May 2016	Stephan A Neu	Kreditanstalt fuer Wiederaufbau (KfW)	Country Director
19 May 2016	Hans Beuster and Inyambo L. Nyumbu	GFA – GIZ Climate Change Project	Team Leader, Deputy Team Leader
19 May 2016	Stanislaus M Chisakuta	Ministry of Agriculture, Department of Agriculture, Technical Services Branch	Deputy Director

Glossary

Certificate of title refers to an official document issued and signed by the Registrar of Lands and Deeds which is proof or evidence of the fact that a person has been granted legal rights or a title to land by the state in accordance with the lease agreement. The Certificate provides information about the status of the property, its location and dimensions and so on, including descriptions of any buildings currently on the property.

Communal rights refer to the right to use land and resources by a group such as a family, community or clan. Such rights are often exercised under customary tenure.

Conversion refers to changes in the mode of ownership of land or land tenure, such as converting customary tenure to leasehold tenure, or vice-versa.

Cumulative Environmental Impact Assessment (CEIA) applies to projects with multiple components, such as a cascade of dams along a river, and aims at assessing the cumulative environmental impacts deriving from theses interventions.

Customary area is land other than State Lands and Reserves (formerly Reserve and Trust Land). It is also commonly known as Traditional Land. Traditional land in Zambia has been governed by traditional customs and is, as such, recognised by the Land Act of 1995. The Act allows for the conversion of title from traditional to state lease. One can obtain 14-year leases for a piece of land in traditional areas if one obtains the consent of the chief and has a sketch plan for the area. Conversion is generally premised on the understanding that the chief has made the necessary consultations with his "subjects" and therefore, when he provides his consent, it is assumed that this has been adequately done. Currently, all land on title in customary areas have a consent form signed by the chief. Where land is over 250 hectares, the conversion process from traditional land will also require the Minister's approval.

Customary land tenure refers to land rights that are controlled and allocated according to traditional practices. These practices are not uniform and differ according to prevailing social norms, cultures and attitudes towards land. They range from individual, family or groups of families, clans and tribal land ownership, where such land is used communally through various tenancy arrangements. Customary land is not titled and not subject to taxation. Moreover, customary land is not owned although users enjoy permanent use-rights; it can neither be sold nor rented out.

Customary land title refers to a legal holding of land, the ownership of which may be individual or collective and that has been occupied and used for cultivation, grazing or hunting (identifiably) prior to Zambia's sovereignty to the present day.

Environmental clearance: A project assessed by an EIA or EIS gets clearance (the go ahead) through an environmental clearance document/letter which may include conditions as endorsed in environmental management plans for managing natural resources.

Environmental Impact Assessment (EIA) (or Environmental Impact Study, EIS, as it is called in Zambia) is an instrument that assesses environmental impacts of projects; it is guided by administrative procedures.

Land lease is an agreement for the temporary use of land by a lessee who pays rent to the lessor (owner, that is, the state in the case of statutory lease).

Land tenure is a relationship – either statutory or customary – between people and its related to land and associated natural resources (forests).

State Land in Zambia means land which is not situated in customary areas. The state lease will normally be given for a period of 99 years.

Statutory minimum flows are guaranteed minimum flows in a river to be maintained after water has been drawn off; it is part of the "water reserve" as defined in the Zambian Water Act (2011). Minimum flows should be defined for both low flow periods and flood events, and typically result in the reduction of the allocable water.

Statutory titled land/leasehold title means any land within Zambia whether virgin, bare or with improvements made on it. It includes units and remainders under common leasehold schemes, tenements and hereditaments, but does not include any mining rights as defined in the Mines and Minerals Act in or under or in respect to any land.

Strategic Environment Assessment (SEA) applies to policies, plans and programmes most often proposed by organs of the state. Environmental assessments are governed by administrative procedures regarding public participation and the documentation of decision-making, and may be subject to judicial review.

Water allocation regime: The term describes the combination of policies, mechanisms, and governance arrangements (entitlement, licenses, permits, and so on) used to determine who is allowed to extract water from a resource pool, how much may be taken and when, as well as how much must be returned (and of what quality), as well as the conditions associated with the use of this water.

Water permit: A water permit is part of a water allocation regime and assigns water-use rights to commercial water users. Its holder is entitled to use a specified quantity of water for a defined period. Water permits are subject to renewal at regular intervals and can be withdrawn (see Box 3).

Water reserve: The water reserve comprises priority water use(r)s, statutory minimum flows and international water requirements in shared watercourses. It thus has both a human-rights and an ecological component.

Water right: Water rights define a relationship between people in connection with water. Water rights – formal and informal – are part of a legal system for allocating water rights to a user. In the Zambian context, the water rights system of the Water Act of 1949 was perceived inflexible because its guaranteed infinite use-rights period did not consider changing patterns of demand and the impacts of climate events.

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