Official Development Finance for Infra-System Transition towards Sustainability: Case of Kenya

Dong Le

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Abbreviations

ADB	Asian Development Bank
ADFD	Abu Dhabi Fund for Development
AEG	Aid Effectiveness Group
AES	Aid Effectiveness Secretariat
AFD	Agency for French Development
AfDB	African Development Bank
AFESD	Arab Fund for Economic and Social Development
AGL	Akiira Geothermal Limited
AIA	Archaeological Impact Assessments
AICD	Africa Infrastructure Country Diagnostics
AIIB	Asian Infrastructure Investment Bank
AUC	African Union Commission
BADEA	Arab Bank for Economic Development in Africa
BOAD	Banque Ouest Africaine de Développement
BRICS	Brazil, Russia, India, China and South Africa
CARI	China Africa Research Initiative
CBO	Community-based Organizations
CC	County Commissioner
CCCC	China Communications Construction Company
CCICED	China Council for International Cooperation on Environment and Development
CDM	Clean Development Mechanism
China EXIM	Export-Import Bank of China
CG	Consultative Group
CICL	Centum Investment Company Limited
CRBC	China Road and Bridge Corporation
CSR	Corporate Social Responsibilities
DAC	Development Assistance Committee
DAG	Development Assistance Group
DBSA	Development Bank of Southern Africa
DCs	District Commissioners
DCG	Donor Coordination Group
DEG	German Investment Corporation
DFID	Department for International Development
DMG	Department of Mines and Geology
DOs	District Officers
DPs	Development Partners
DPF	Development Partnership Forum
DRC	Democratic Republic of Congo
EADB	East Africa Development Bank
EBID	ECOWAS Bank for Investment and Development
EC	European Commission

EIA	Environmental Impact Assessments
EIB	European Investment Bank
EMCA	Environmental Management and Co-ordination Act
E&R	Environmental and Social
ERB	Electricity Regulatory Board
ERC	Energy Regulatory Commission
ERI	Exploration Risk Insurance
ESIA	Environmental and Social Impact Assessment
ESRs	Environmental and Social Risks
ET	Energy Tribunal
FBO	Faith-Based Organization
FDI	Foreign Direct Investment
FIDES	Investment Fund for the Economic and Social Development of Overseas Territories
FiT	Feed-in-tariff
FOCAC	Forum on China-Africa Cooperation
GDC	Geothermal Development Company
GDP	Gross Domestic Product
GJLOS	Governance reforms, human rights reforms, Justice reforms, and Law and Order reforms
GOGC	Greater Olkaria Geothermal Complex
GoK	Government of Kenya
HAC	Harmonization, Alignment, and Coordination
ICA	Infrastructure Consortium for Africa
ICB	International Competitive Bids
ICT	Information and Communication Technology
IDA	International Development Agency
IDB	Islamic Development Bank
IMF	International Monetary Fund
IPP	Independent Power Producers
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
JICA	Japan International Cooperation Agency
KenGen	Kenya Electricity Generating Company
KES	Kenyan Shillings
KETRACO	Kenya Electricity Transmission Company
KFAED	Kuwait Fund for Arab Economic Development
KfW	Development Bank of Germany
KJAS	Kenya Joint Assistance Strategy
KPLC	Kenya Power and Lighting Company
LAPSSET	Lamu Port and Southern Sudan-Ethiopia Transport Corridor
LCOE	Levelized Cost of Energy
LTWP	Lake Turkana Wind Project
MBDC	Media-Based Data Collection
MDGs	Millennium Development Goals
MIGA	Multilateral Investment Guarantee Agency

MLP	Multi-Level Perspective
MOFA	Ministry of Foreign Affairs
MOL	Ministry of Land
MW	Megawatts
NA	National Administration
NDB	New Development Bank
NDRC	National Development and Reform Commission
NEMA	National Environmental Management Authority
NGO	Non-Governmental Organization
ODA	Official Development Assistance
ODF	Official Development Finance
OECD	Organisation for Economic Co-operation and Development
OFID	Organisation of the Petroleum Exporting Countries (OPEC) Fund for International Development
OOF	Other Official Flows
OPIC	Overseas Private Investment Corporation
PA	Provincial Administration
PCs	Provincial Commissioners
PIDA	Programme for Infrastructure Development in Africa
PPA	Power Purchase Agreement
PPP	Public Private Partnership
PRSPs	Poverty Reduction Strategy Papers
REA	Rural Electrification Authority
RERAC	Renewable Energy Resources Advisory Committee
PPIAF	Public Private Infrastructure Advisory Facility
RMB	Chinese Renminbi
SAPs	Structural Adjustment Programmes
SDGs	Sustainable Development Goals
SFD	Saudi Fund for Development
SNM	Strategic Niche Management
ST	Sustainability Transitions
STEP	Special Terms for Economic Partnership
SWG	Sector Working Group
TIS	Technological Innovation Systems
TM	Transition Management
UN	United Nations
UNDP	UN Development Programme
UNEP	United Nations Environment Programme
USAID	U.S. Agency for International Development
USD	U.S. Dollar
USTDA	U.S. Trade and Development Agency
WBG	World Bank Group
WWF	World Wide Fund For Nature

Executive Summary

Recent trend reveals that the Official Development Finance (ODF) in the international aid architecture needs transition by going beyond traditional Official Development Assistance (ODA), and by strengthening its sustainability towards the Sustainable Development Goals (SDGs), especially in the infrastructure domain.

Infrastructure in developing countries require urgent transition towards sustainability, during which international ODF can play an important role. However, traditional donors tend to finance more of their ODA on social sector, such as governance, health, and education, albeit with the exception of some donors like Japan. Recent decades have seen the incremental influence of emerging donors, mainly China and India, in providing infrastructure finance to developing countries through their Other Official Flows (OOF) (Gurara et al. 2017). For instance, China ranked the top in terms of infrastructure financing to Africa with a total of USD 13,443 million, almost doubled the volume of the second largest provider, the U.S. (ICA 2014).

The infrastructure-oriented finance in Africa represented by China has generated heated debate widely in policy and academia arenas. Gradually consensus has been made that financing infrastructure could help develop the economic infrastructures for developing countries, unleash the economic development potential and facilitate trade and investment, and eventually result in structural transformation (Lin & Wang 2017). Meanwhile, if potential environmental and social risks are not managed well by financiers, including but not exclusively to emerging donors, it can also be environmentally and socially disruptive.

Infrastructure transition requires not only physical construction and development of infrastructure projects, but also institutional changes, therefore, the term infra-system transition and theory of sustainability transition are adopted in this research. Sustainability transition theories could provide analytical framework in construing how ODF can help mobilize the interactions between niche and regime levels in a broad landscape context towards sustainability. This research aims to explore the answer to the question: how ODF can help promote the sustainability transition of infra-systems in developing countries?

The research builds its conceptual framework in Chapter 2 on the theories of sustainability transition, a rapidly developing field in the past two decades with the advantage of construing the multi-actors' interaction at niche, regime, and landscape levels, especially for the infra-system domain (Geels 2004). Developed on the actor and role theory which is mainly for exploring how actors can influence regimes (Wittmayer et al. 2017), the hypothesis is that it is only when donor actors change their single roles and play

role constellation among donor and recipient actors with sustainability perspective that their niche projects motivate sustainability transition of recipient's infra-system regime. Without the sustainability perceptive, they hinder the transition. Focusing on either role change or role constellation, not to mention the sustainability perspective is not enough for donors to design their ODF towards the desired goal.

In Chapter 3, Kenya is selected as case study country which is confronted with huge financing gap in its infra-system domain, and among the top ODF recipients from both traditional and emerging donors in Africa. To answer the research question that "how can ODF, from both traditional and emerging donors, at the niche level affect the rules and institutions at the regime level for the infra-system's sustainability transition in Kenya", and to test the above proposed hypothesis, this dissertation takes three cases in Kenya: 1) The first case is Lamu Port, to be the largest port in east Africa upon completion and involving Chinese ODF actors, with the aim to explore how Chinese actors have changed their roles concerning the mitigation of potential environmental and social risks; 2) The second case is the Olkaria I and IV geothermal project, the single largest one in the world by 2017 and involving traditional and Chinese ODF actors, with the aim to explore how these donor actors change their roles in project coordination and their role constellation; 3) The third case is the renewable electricity transition in Kenya, to explore how international ODF actors as a whole have shifted the transition through role change and role constellation together with the recipient actors in the past decades.

In Chapter 4, the role change of Chinese ODF actors concerning potential environmental and social risks is examined with the case of Lamu Port project. Questionnaire survey with 35 community members were conducted in 2013 to examine the changes to local actors, and semi-structured interviews with 59 representatives from Chinese government, Kenya government, Chinese companies, Chinese media, NGOs, and researchers were carried out in 2013, 2014 and 2017 to identify the actors, explore the role changes of Chinese actors and their relations with Kenyan actors. The results reveal that Chinese companies have changed their roles qualitatively to a large extent so that the contractor of the first three berths proactively took countermeasures required by the Kenyan contractee to mitigate almost all the environmental and social risks in the construction. While, Chinese government has not changed its role qualitatively, albeit quantitatively by continuously issuing several voluntary regulations. Meanwhile, the role constellation is limited at the government level on sustainability issues. Therefore, the influence of Chinese ODF on the transition of Kenya's infra-system's may not be sustainable, though the physical development of port per se

may result in social and economic benefits. A coordination mechanism is proposed with full awareness of possible challenges in reality.

In Chapter 5, the role change and role constellation of traditional and Chinese donor actors are examined with the case of the Olkaria I and IV geothermal project. Nine key informant interviews with Kenyan electricity companies, development agencies and multilateral development banks in 2015 and 2016 provided the primary data, with the supplementary of secondary data from literature survey. The key findings are that Chinese actors still bilaterally coordinate with the Kenyan actors, though invited to join the coordination mechanism of traditional donors, which resulted in higher transaction cost, ineffective project operation, and negative environmental and social risks. Meanwhile, the role constellation in the project coordination does exist among tradition donors, however only to a limited extent. The role constellation barely exists with Chinese actors for various reasons: first, Chinese actors lack incentives to participate the coordination with traditional donors, and lack a unanimous representative agency at the organizational level; second, traditional donor actors are still preparing readiness and exploring approach of engaging with emerging donors including China; third, the Kenyan government may gain some leeway and obtain aid negotiation capital in working separately with two groups of donors. A trilateral cooperation mechanism among Germany, China and Kenya is proposed as an exploration of possible aid coordination.

In Chapter 6, the role change of international ODF donor actors and their role constellation with recipient actors are examined with a historical review of renewable electricity transition in Kenya. Six key informant interviews with Kenyan electricity companies, and multilateral development banks in 2016 provided the primary data, with the supplementary of secondary data from archival records and official documents. The findings are that international actors have provided both financial and technological support to renewable transition at both niche and regime levels, which helped the rapid growth of renewable electricity in the past decades. The roles of international ODF actors, especially the World Bank, have changed within role constellation with Kenyan actors, by fostering niche level experimentation and adjusting regime level support. Additionally, the examination of three niche novelties adopting geothermal and wind power revealed that protective policies on Independent Power Producers (IPPs) from both Kenyan government and international donor actors are needed for further niche accumulation towards renewable energy transition.

Chapter 7 provides an overview of these three cases for discussions. The results suggest that the hypothesis holds true: ODF donors motivate the sustainability transition of infra-systems in Kenya by

changing their roles quantitatively and qualitatively with sustainability considerations, and by active role constellation at both niche and regime levels among donors and recipient actors. If these are not taken into consideration or put into implementation, the sustainability transition of infra-system may be undermined. Further discussions are made in terms of implications for development study and sustainability transition study: the sustainability of Chinese ODF, transition of traditional ODF, ODF evaluation by recipients, infra-system transition in developing countries, role constellation of donor actors and recipient actors towards sustainability transition, and ODF intervention for the SDGs.

The contribution of this research to the global environmental studies, provided in Chapter 8 together with the recommendations for future research, are: First, enriching the analytical framework of development aid by integrating the sustainability transition theories. This will help analyze how particular type of ODA or ODF help attain the SDGs for developing countries; Second, finding out conditions and contexts with which donors can help promote the sustainability transition of infra-systems in developing countries, which goes beyond the dichotomy between traditional and emerging donors.

Chapter 1 Introduction

Infrastructure in developing countries requires urgent transition so as to realize the Sustainable Development Goals (SDGs), during which international Official Development Finance (ODF), in the modality of Official Development Assistance (ODA) and Other Official Flows (OOF), can play an important role in mobilizing the private sector to finance in the infrastructure domain. For various reasons, traditional donors since 1940s have presented more interest in financing their ODA on social sector in developing countries, such as governance, health, and education, albeit with the limited exception of some donors like Japan who have hold the belief of activating the economy by financing on infrastructure from their ODA provision lessons.

However, in recent decade the infrastructure featured OOF from emerging donors, mainly China and India, have triggered heated discussion in policy and academia arenas on the critical role of infrastructure financing for the developing countries in realizing their sustainability transition (Gurara et al. 2017). For instance, China ranked the top in terms of infrastructure financing to Africa in 2013 with a total of USD 13,443 million, while the U.S., the second largest, provided USD 7,008 million (ICA 2014).

The infrastructure oriented ODF from China could also be manifested by its committed billions of dollars of infrastructure investment under the "Belt and Road" initiative, an ambitious plan to boost trade and economic development by strengthening the linkages between Asia, Europe, and Africa, as well as the establishment of Asian Infrastructure Investment Bank (AIIB), a new multilateral institution initiated by China with the aim of supporting the infrastructure needs in Asia.

It is regarded that the emerging way of providing aid, trade and investment beyond the traditional ODA, and using China's comparative advantage to address Africa's infrastructure bottlenecks are effective for the structural transformation by boosting economic growth and fostering social changes towards sustainability transition (Lin & Wang 2017). Meanwhile, given the large scale of influence of infrastructure projects, if potential negative environmental and social risks are not managed well, it can also be environmentally and socially disruptive. Therefore, it seems essential to conduct research to figure out how ODF can help promote the sustainability transition of infrastructure systems in developing countries.

Infrastructure systems provide society with crucial services, including transport, energy, water, and communication. The structural transformation may start with the financing on the physical infrastructure projects, however, it will not happen naturally just with it. Because the "infra-system" goes beyond the

"infrastructure" which denotes "the physical components of these systems", and it also includes "the services that make use of and are generated through the infrastructure, the market structure, the legislative and regulatory framework and the broader institutional context" (Loorbach et al. 2010). Therefore, the infra-system transition in one society denotes the dynamics in the socio-technological systems with both physical and multi-actor network complexity.

For the role and impact of physical infrastructure system, scholars may adopt existing research frameworks to analyze the expected or real changes after the construction, for instance, estimating the contribution to the local employment, the local economy, or side effects such as environmental damages. However, it requires sustainability transition theories, a rather new research field, to understand how the construction of physical infrastructure system affects the infra-system at niche and regime levels, to construe who are configuring the multi-actors network, and to explore the barriers in the infra-system transition.

Realizing the sustainability vision not only calls for collaboration among all actors including and beyond the donors, but also a better understanding of the complex societal fabrics building up the systems, for instance how the actors could open the opportunity window, way out the lock-in, and promote the sustainability transition. Against the background, a new field of "Sustainability Transitions" has gradually gained attention within the past 15-20 years. It builds on the argument that the interconnected, complex and global characters of current challenges for human being such as climate change or extreme poverty necessitate a "radical change in a wide range of socio-technical systems" (Schot & Kanger 2016).

Major sustainability transitions (ST) frameworks such as Multi-Level Perspective (MLP), Strategic Niche Management (SNM) or Transition Management have been widely used to clarify and motivate socio-technical transitions. While construing the dynamics of actors in the developing countries' infra-system transitions, the role of exogenous donor actors became increasingly significant, despite a wide range of endogenous public support scheme for infra-system investment. Discussions on how donors could better contribute to the developing world's sustainable development are not novel in academia, with productive research on ownership empowerment of the recipient countries (Whitfield & Fraser 2010), and aid coordination or collaboration among the South-South (Fordelone 2008) or the North-South (Kato 2012).

Nonetheless, the advantage the ST field has over other fields, such as economic geography, political economy or development studies, is that "ST theories offer a systemic and socio-technical perspective on radical change, in the context of which, a great variety of specific questions can be asked" (Wieczorek 2017), especially when the field of development finance are experiencing tremendous dynamics featured with the

joining of emerging donors and re-focusing on infra-system, and it becoming challenging to clearly understand current complex dynamics. This dissertation aims to adopt the ST theories to study the role of ODF in developing countries' infra-system transitions towards sustainability, and sharpen and develop the ST theories on how the actors at niche level affects the rules and institutions at regime level.

This chapter provides outline of the two fields – official development finance and sustainability transitions – and the necessities and possibilities of synthesizing these two fields of studies; and then briefly illustrates the reasons of focusing on the international and Chinese official development finance to infra-system transitions in Africa; and in the end, introduces the structure of this dissertation.

1.1 Official development finance requires sustainability transition

After decades of evolvement since 1940s, with donor proliferation and extensive focuses in a fast changing aid architecture featuring emerging donors, Official Development Finance (ODF) has come to the point of transiting to sustainability trajectory, so as to contribute effectively to the realization of 17 SDGs by 2030.

First of all, it is important to set a common definition. ODF in this dissertation follows the OECD definition agreed upon in 1972 by the Development Assistance Committee (DAC) members. ODF consists of Official Development Assistance (ODA) and Other Official Flows (OOF) (Figure 1.1).

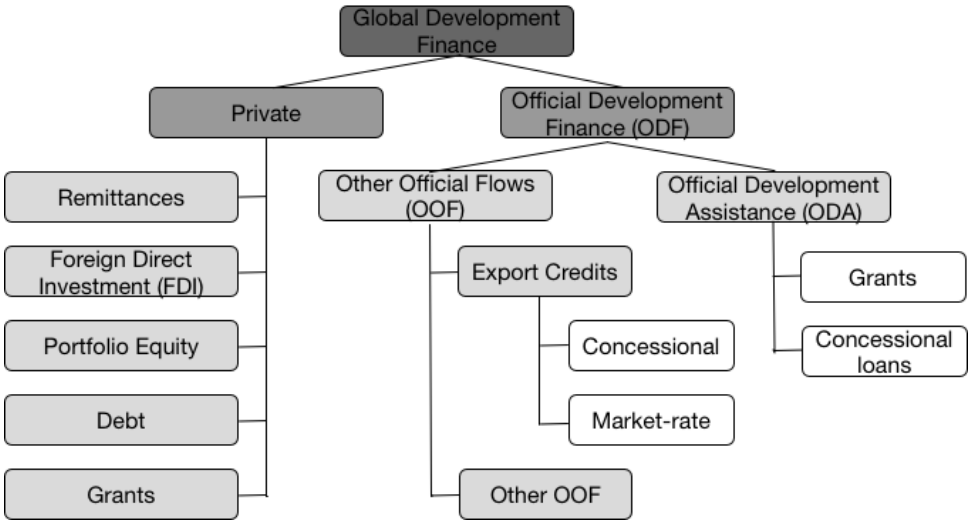

Figure 1.1 Structure of global development finance.
Source: Adapted from Brautigam (2011b), Page 204, Figure 13.1.

ODA is defined as assistance to countries and territories on the DAC List of ODA Recipients and to multilateral development institutions (OECD 2009): 1. Provided by official agencies, including state and

local governments, or by their executing agencies; 2. Each transaction is administered with the objective of promoting economic development and welfare of developing countries, is concessional and has a grant element of at least 25 percent. ODA includes grants and concessional loans that are extended on terms substantially more generous than market loans and the concessionality is achieved either through the interest rates below those available on the market or by grace periods, or a combination of both (OECD 2003).

Besides ODA, there is also Other Official Flows (OOF) which includes grants to developing countries for representational or essentially commercial purposes, or those with a grant element of less than 25 percent, and official bilateral transactions, whatever their grant element, that are primarily export facilitating. This includes export credits (OECD 2011). The reason this paper chooses the term ODF is China's official finance falls primarily into the category of OOF, unlike traditional donors' focus on ODA (Brautigam 2011b).

After the Second World War, the colonial powers started to provide ODF in their overseas territories. In 1960, the Development Assistance Group (DAG) was formed as a forum for consultations among donors on assistance to less-developed countries, and later in 1961 reconstituted as Development Assistance Committee (DAC). Currently DAC has 30 members, and 20 non-DAC countries report their ODF to DAC. In parallel and in collaboration with bilateral development agencies, multilateral institutions were created under the auspices of the World Bank Groups (1944), the International Monetary Fund (IMF, 1944), the United Nations agencies (1945), the African Development Bank (1964), and the Asian Development Bank (1966).

Until the 2000s, the development aid world had extensive debated on ODF policy and regulations, such as concept, aid untying, aid coordination, and aid effectiveness. Last decade saw more stress from DAC on aid effectiveness, especially towards the Millennium Development Goals (MDGs). In 2005, Aid-for-Trade was proposed to go beyond traditional ODA, and address the supply side and trade-related infrastructure constraints hampering developing countries' participation in global trade.

The last decade also witnessed the Global South becoming influential in providing ODF to other developing countries, especially China rising from 16th in 2001 to 9th in 2014 in term of total net foreign aid (Kitano & Harada 2014). In terms of three-year average of ODF to Africa from 2010 to 2012, China ranked the 10th among all countries and multilateral organizations, and the 6th among countries (Table 1.1).

Examining ODF from China to Africa for instance, the ODA and OOF are almost equivalent. While traditional donors rarely finance infrastructure, China intensively does with its OOF. From 2000 to 2012, transport and storage took up the most with 17.4 percent, and energy generation and supply took 17 percent (Figure 1.2). In comparison, traditional donors mostly focus on social sector including education, health,

government and civil society (Figure 1.3).

Table 1.1 The ranking of donors by net ODF in Africa from 2010 to 2012, in USD million

Category	2010	2011	2012	3-year average	Rank
DAC countries in total	28660.15	31718.52	29098.48	29825.72	/
No. 1 United States	7753.21	9830.63	9221.87	8935.24	1
No. 2 France	3235.35	4002.89	3056.2	3431.48	4
No. 3 United Kingdom	3039.01	3352.03	3466.9	3285.98	5
No. 4 Germany	1906.06	2487.93	2307.73	2233.91	6
No. 5 Japan	2009.11	1744.72	1848.9	1867.58	9
No. 6 China	/	/	/	1716	10
Multilateral	22557.14	22938.27	24213.64	23236.35	/
No. 1 EU Institutions	6620.58	5957.31	6841.37	6473.09	2
No. 2 IDA	5195.91	4739.23	4712.07	4882.4	3
No. 3 AfDB	1702.29	2146.72	1787.99	1879	7
No. 4 Global Fund	1914.4	1534.33	2172.81	1873.85	8
No. 5 IMF	1194.2	1057.48	837.13	1029.6	12

Source: Author compilation based on OECD (2014).

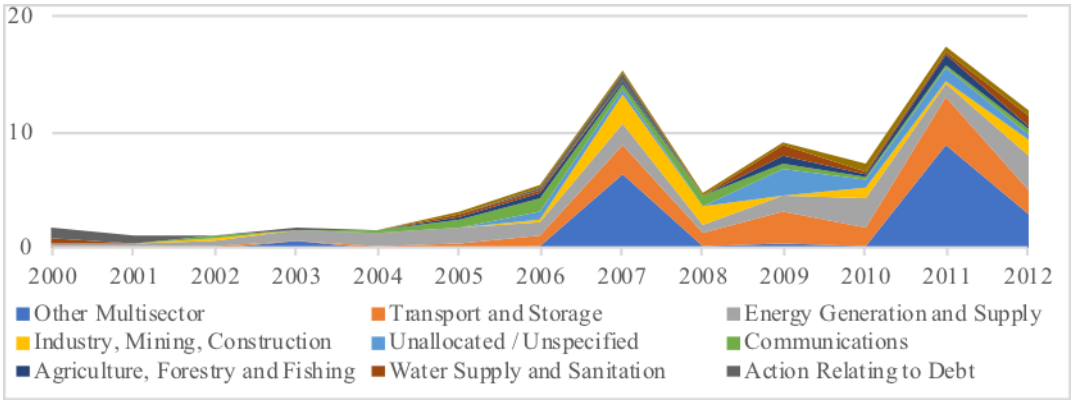

Figure 1.2 Chinese ODF to Africa by sector in 2000-2012, in USD billion.
Source: Author compilation based on AidData (2013).

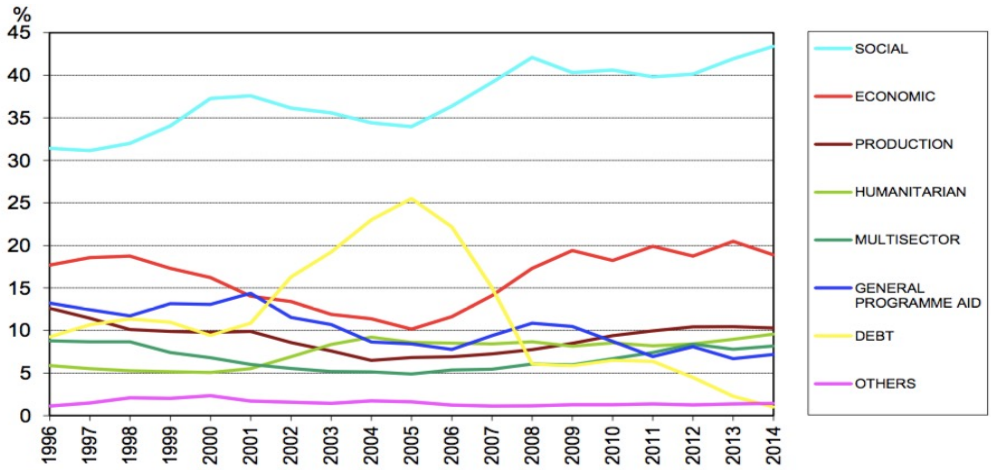

Figure 1.3 ODA from DAC to Africa by sector in 1996-2014, as a percentage of total ODA to Africa.
Source: OECD, 2017b, Page10, Figure 2.3.1.

Same difference can also be manifested when disaggregating the overall ODF to individual recipient country level. For the top five recipients by commitment ODA from DAC to Africa in 2011, social sector attracted most of DAC's ODA, with the exception of Democratic Republic of Congo whose debt cancellation surpassed other sectors (Table 1.2). In terms of top five recipients by loan from China to Africa from 2000 to 2015, the database by Johns Hopkins (Atkins et al. 2017) discovered that economic infrastructure were the priorities (Table 1.3). Table 1.3, on one hand, provides the fact for which researchers criticized China finance natural resource rich countries and may lead to environmental degradation (Zafar 2007; Moyo 2012; Cáceres & Ear 2013), on the other hand, it also revealed that China is also interested in financing the infra-system sectors – transport, power, water and communication, due to its comparative advantages (Davies et al. 2008; Foster et al. 2009; Cassel et al. 2010).

Table 1.2 Top five recipients by commitments ODA in 2011 from DAC by sector, in USD million

Country	Social	Economic	Production	Multi-sector	General Program Aid	Debt	Human-itarian	Others	**Total**
DR Congo	1034	713	93	101	221	3232	421	7	5822
Kenya	1489	727	104	185	347	1	523	15	3390
Ethiopia	944	282	184	597	179	5	640	8	2840
Tanzania	1264	322	285	137	383	4	43	11	2451
Mozambique	1196	129	206	86	395	0	15	17	2045

Source: Author compilation based on OECD (2013).

Table 1.3 Top five recipients by loan from 2000 to 2015 from China by sector, in USD million

Country	Transport	Power	Mining	Water	Communication	Industry	Government	Other	**Total**
Angola	2911	1542	7500	504	368	0	489	5910	19224
Ethiopia	4373	2548	0	634	3162	2020	0	330	13067
Kenya	5555	597	0	0	74	0	177	446	6849
Sudan	2513	2887	0	346	10	180	121	420	6477
Cameroon	992	596	0	944	424	14	392	361	3723

Source: Author compilation based on Atkins et al. (2017).

These infrastructure featured ODF from emerging donors, with the leading one being China, has triggered heated discussion in both policy and academia arenas on the importance of infrastructure financing for developing countries. Gradually the consensus has been made that the emerging way of providing aid, trade and investment beyond the traditional aid, and using China's comparative advantage to address Africa's infrastructure bottlenecks could be effective for the structural transformation by boosting economic growth and fostering social changes.

All these dynamics are happening within a new set of Sustainable Development Goals (SDGs). The multi-dimensional characters of the SDGs urge the ODF to transform from business as usual, inter alia, to expand the engagement with a broader range of public and private actors in the infra-system financing, and apply sustainability related results and evidence to theoretically improve their effectiveness in the sustainability transition of developing countries.

1.2 Sustainability transition study provides novel framework for development finance

Sustainable development is wishful and desirable, yet it does not easily come by itself. Considering all the fundamental sustainability challenges we are facing now in several domains, such as climate change, extreme poverty, loss of biodiversity, energy supply, transportation sector, water supply and sanitation systems, only with sustainability transition (ST) from current business-as-usual model, can we operate on a sustainable trajectory. As Jeffrey Sachs in his book *The Age of Sustainable Development* (2015) depicted, ST requires embracing the complexity of four interacting systems: global economy, social interactions, earth systems, and governance.

Simply focusing on one system will not solve the problem. Take climate change for instance, the current policies are often not sufficient to meet the announced national targets due to a combination of economic, political, social and cultural factors. Therefore, we need to improve our understanding of transitions so as to better inform governance and policy (Turnheim et al. 2015).

Although there are also related strands of research on "green issues", for instance, the study of sustainability sciences, ecological modernization, green management, corporate social responsibility, industrial ecology or transformation and so on, research on "sustainability transitions" since 1990s comprises all scientific studies that are "concerned with the analysis of the institutional, organizational, technical, social, and political aspects of far-reaching changes in existing socio-technical systems" (Markard et al. 2012:959), such as the transportation and energy supply, which are connected to more sustainable or environmentally friendly modes of production and consumption.

Given the fact that the impact of international development finance on the developing countries' infra-system transition is undeniable, either in a good or bad way, recently some scholars tried to adopt ST theories to study the role of development finance in developing Asian and African countries. Some empirical research have been conducted on energy infra-system transition. Hansen and Nygaard (2013), through the development of a palm oil biomass waste-to-energy niche in Malaysia, argued that donor interventions more

often hinder radical changes in a niche development. Marquardt et al. (2016) wrote that donors cannot force the energy transitions in the Philippines or Morocco, but can be a driving force for testing alternative ways for electricity supply. Tigabu et al. (2017) found that international official development aid has significantly influenced major innovation activities related to improved cook stoves in both Kenya and Rwanda over the last 30 years.

Some theoretical concepts have also been discussed concerning the cross-fertilization of the two fields – sustainability transition and development studies. Marquardt (2015) argued that transition management of ST can be a useful analytical approach for clarifying the role of external actors and participation of development aid in the ST of developing countries. After systematically examining 115 publications on ST in developing countries, Wieczorek (2017) found that the specific advantage of ST studies over economic geography, political economy or development studies is that they offer a systemic and social-technical perspective, in the context of which, further engagement with development studies could allow for a productive cross-fertilization. Therefore, sustainability transition theories may provide a more comprehensive analytical framework for a clearer understanding on the role of ODF in the infra-system transition for developing countries.

1.3 Research question and structure of the dissertation

Considering that official development finance will keep on playing a critical role in the infra-system transition for developing countries, this dissertation examines the fundamental question: **how can official development finance promote the infra-system's sustainability transition in developing countries?**

A case study approach is adopted to explore this question. A case study country is selected based on two considerations: 1) a country receiving a large volume of ODF, and engaging with a variety of donors including the emerging donors, particularly China; 2) a country whose infra-system needs transition and requires ODF.

Africa is the focus in light of these two criteria. Africa, with 34 countries recognized as least developed countries by the United Nations out of 48 totally in the world (UNCTAD 2014), attracts the majority of ODF from global donors. Take the net ODA from DAC in 2015 for example (due to no OOF data), the total net ODA to Africa amounts to USD 51,036 million, accounting for 33 percent of total net ODA (OECD 2017b), higher than any other region, and compared to 30 percent for Asia. Currently, the continent's lagging infra-system is severely affecting its sustainable transition and the financing gap is large. The road access

rate is only 34 percent, compared with 50 percent in other parts of the developing world, while transport costs are 100 percent higher. Only 30 percent of Africa's population has access to electricity, compared to 70-90 percent in other parts of the developing world (PIDA 2010). A World Bank (2017) report revealed that closing the infrastructure gap relative to the best global performers could help increase growth of GDP per capita in Africa by 1.7 percent per year. However, public capital spending by African countries is estimated at 2 percent of GDP annually between 2009 and 2015, indicating an urgent need for international ODF.

Kenya is chosen, also against these two criteria: 1) it ranks in the top ten among DAC's ODA recipients in Africa and Aid-for-Trade recipients in the world, and in the top five among Chinese ODF in Africa (OECD 2016, OECD 2017b, Atkins et al. 2017); 2) east Africa needs the most infra-system financing in Africa, and Kenya's funding gap is the largest (Shendy et al. 2015). Detailed reasons are provided in Chapter 3.

This research aims to adopt sustainability transition (ST) theories to study the role of donor actors in developing countries' infra-system transitions towards sustainability, namely, the international and Chinese official development finance in Kenya' infra-system transition. The author seeks to explore and develop leading ST theories on how the actors at niche level can affect the rules and institutions at regime level, with case studies in Kenya providing retrospective examination and future guidance for the international and Chinese donor actors towards a better infra-system financing in Kenya or Africa at a larger scale.

The dissertation is organized as follows. Chapter 2 includes a literature review on development finance and ST studies; illustrating their achievements and challenges. Chapter 3 briefs on the ODF and sustainability transition in Kenya, and states the research question, hypothesis, and approaches to examine the international infra-system finance in Kenya. Chapter 4 examines the dynamics of Chinese and Kenyan actors concerning Chinese finance induced sustainability issues on a port project which is to be the largest in east Africa upon completion. Chapter 5 explores the interaction of Chinese and traditional donor actors in financing Kenya's largest geothermal project, the Olkaria I and IV geothermal projects. Chapter 6 retrospectively examines the role of international actors as a whole in Kenya's energy transition towards sustainability. Chapter 7 further discusses the role change and role constellation in Kenya's infra-system transition, and summarizes the implications for two fields of study, which forms the basis of the contribution of this dissertation. Chapter 8 concludes with originality and suggestion for future studies.

Chapter 2 ODF and sustainability transition in developing countries: achievements and challenges

The recent trend of official development finance (ODF) in refocusing on infra-system in developing countries requires a better understanding how the physical infrastructure projects at niche level could have positive effects on the infra-system regimes towards the transition. In comparison with the fields of economic geography, political economy or development studies, the sustainability transition (ST) theories provide a socio-technical perspective, a new way of framing the complex systems and processes and reviewing the development finance in a bigger and systemic picture, which could "make the context and its impact more explicit and articulated, factors which development studies have not considered in great length" (Wieczorek 2017:7).

This chapter aims to cross-fertilize these two fields of ODF and ST studies. Section 2.1 and 2.2 respectively explains the achievements and challenges in these two fields of studies, and Section 2.3 provides a literature review on using the ODF for ST in developing countries.

2.1 ODF study

2.1.1 Change in the mainstream of ODF

Fraser (2009) divided international ODF into five time periods: 1) from 1945 to1975, post-colonial period, when much of the international aid architecture begun to develop; 2) from 1975-1980, following the New International Economic Order, when developing countries started to negotiate policies which would not be the first choices of the donors; 3) in the 1980s, with the Structural Adjustment Programmes (SAPs), developing countries' negotiating strength evaporated, resulting in the imposition of SAPs; 4) in the 1990s, as adjustment after the Cold War, aid conditions gradually expanded from macroeconomics into realms including public sector reform, governance, and social policy. By 2000, a complex conditionality and surveillance regime had been developed: aid recipients had less initiative and room to design national policies; 5) from 2000 onwards featured country ownership, recipient governments looked for the political will to present their own preferred programs in the form of a multi-year development plan.

After the Second World War, the colonial powers started to provide ODF in their overseas territories. For instance, the United Kingdom reorganized its development assistance through the "Colonial

Development and Welfare Act" in 1945; France established the Investment Fund for the Economic and Social Development of Overseas Territories (FIDES) in 1946; and Japan started reparation payments to Burma, the Philippines, Indonesia and Viet Nam in 1955.

The success of the Marshall Plan created considerable optimism concerning helping the poorer countries through providing external development assistance (Fuhrer 1996). In 1960, the Development Assistance Group (DAG) was formed as a forum for consultations among donors on assistance to less-developed countries, and later in 1961 reconstituted as the Development Assistance Committee (DAC). The original members included Belgium, Canada, France, Germany, Italy, Portugal, the United Kingdom, the United States, and the Commission of the European Economic Community (later reconstituted as OECD). Japan and the Netherlands joined right after. Currently DAC has 30 members, and 20 non-DAC countries report their ODF to DAC.

At the same time, multilateral institutions and programs were created under the auspices of the World Bank Groups (1944), the International Monetary Fund (IMF, 1944), the United Nations agencies (1945), the African Development Bank (1964), and the Asian Development Bank (1966). The establishment of multilateral development banks facilitated the ODF provision to developing countries.

The nascent ODF discussions in the 1960s among donors were about the concept definition, aid reporting, and the setting of 0.7 percent target, which set the fundamental ODF regimes among DAC member countries. The 1970s saw the focuses on aid untying, local aid coordination, North-South relations, and the orientation shifting from primarily welfare or charity to productivity for long term self-generating development, which marked the adjustment of ODF principle.

In the 1980s, aid effectiveness came to be re-stressed. Due to the debt crisis by over-borrowing against two oil shocks, World Bank initiated structural adjustment lending to support major changes in policies and institutions of developing countries. DAC also made progress in promoting aid coordination as the proliferation of donors, in cooperation with World Bank and UN Development Programme (UNDP). Regulations on environmental assessment of ODF projects and the principles for project appraisal started to be formulated, marking the improvement of existing ODF regulations. In the 1990s, participatory development was stressed and an important role of local organizations, and self-government. New disciplines for tied aid was also reached. And strong priority on environmental concerns started to gain its ground as a consequence of a global momentum on environmental protection (Fuhrer 1996).

In the end of 1990s, Millennium Development Goals (MDGs) began to be generated due to the demand

from developing countries onto DAC donors to provide a common framework to guide their ODF policies and programs (OECD 2006). In the 2000s until 2015 the concluding year of MDGs, aid effectiveness was regarded as critical towards more and better aid by the multi-lateral development banks. Consensus was achieved on four effectiveness principles: country ownership, results, inclusiveness and transparency and accountability, successively in the Rome Declaration on Harmonization in 2003, the Paris Declaration on Aid Effectiveness in 2005, the Accra Agenda for Action in 2008, and the Busan Partnership for Effective Development Cooperation in 2011, and the First High-Level Meeting of the Global Partnership in 2014.

In 2005, Aid-for-Trade was proposed among the DAC members to go beyond the aid, and address the supply side and trade-related infrastructure constraints hampering developing countries' participation in global trade, which includes aid for: 1) trade policy and regulations, 2) economic infrastructure (transport and storage, communications, energy generation and supply), and 3) building productive capacity (banking and financial services, business and other, agriculture, forestry, fishing, industry, mineral resources and mining, and tourism). In 2015, the total disbursement of aid-for-trade from DAC was USD 39.8 billion, with USD 20.6 billion for economic infrastructure, and USD 18.2 billion for building productive capacity. It is believed that Aid-for-Trade would help address the development issues beyond aid (OECD 2017a).

The post-2015 period is featured by traditional donors trying to address development issues beyond traditional aid within a new set of development goals. A key lesson from the MDGs was that sustained change cannot be achieved through one-dimensional or single sector goals, therefore, the SDGs with their broader focus and coverage require a response incorporating multi-dimensionality into the international aid architecture. Therefore, realizing the 17 SDGs would necessitate the sustainability transition of international development finance, especially on how to transcend from the traditional way of aid provision by engaging with broader actors in the recipient countries (DAC 2016).

2.1.2 Features of Chinese ODF

Besides the abovementioned changes among the traditional donors, the international aid architecture also changed tremendously in the last decade, featured by the joining of the Global South, such as China, India, Brazil, Indonesia, South Africa, Mexico providing sizable ODF. With the flag of South-South Cooperation, these countries became to be influential in providing ODF to other developing countries, especially China rising from 16th in 2001 to 9th in 2014 in term of total net foreign aid (Kitano 2016) and being the leading emerging donor.

China started official assistance to Africa in 1956. In the period of 1956-1977, assistance to Africa accounted for over USD 2.476 billion, taking up to 58 percent of the total Chinese official assistance (Jianbo & Hongwu 2007). After the China's Reform and Open policy in 1978, the form of the Chinese official assistance to Africa shifted from grant or interest-free loan to preferential loan, exploration projects, and co-fund cooperation (Jianbo & Hongwu 2007). Little research about Chinese ODF in Africa was done before the 21st century since the volume was far less than the traditional donors.

After 2000 when the Forum on China-Africa Cooperation (FOCAC) – a high-level dialogue platform between China and 50 African countries on political, economic, cultural, and social cooperation – was established, more and more researchers started to pay attention to the Chinese official assistance in Africa as its ODF volume escalated in recent decade.

Most literature studies on Chinese ODF focused on the historical development, the motive and impact analysis, as well as the current situation. Chinese researchers tend to conclude the cooperation is mutually beneficial and is based on mutual respect and equity (Jianbo & Hongwu 2007). The non-Chinese researchers present some diversified conclusions. Some emphasize the "Angola mode" or "resources for infrastructure" – whereby repayment of the loan for infrastructure development is made in terms of natural resources, an approach between China and Angola and other African countries that has been widely criticized by the western countries – is not unique at all, but follows a long history of natural resource-based transactions in the oil industry (Foster et al. 2009). Some conclude that generally speaking Chinese engagement is far from welcomed by African leaders and citizens, however, it seems not as threatening to Africa as the engagements from Europe or the US (Haroz 2011). Other researchers have argued that "China's non-interference policy and respect for sovereignty has meant that it pays very little attention to the negative externalities that arise from its investment spending" (Condon 2012:7).

More recent research focused on structure and operation system analysis (Davies 2008; Berthelemy 2011; Anshan 2012). At the early stage, researchers could not tell the difference between ODA, preferential loans, and credit lines, probably due to inaccurate translations of the Chinese publications. As this kind of research goes deeper, the complexity of Chinese ODF is revealed, with the paper on *Chinese Development Aid in Africa: What, Where, Why, and how much* (Brautigam 2011b) as the most representative of this kind.

The challenge of quantifying the ODF data appeared as the research developed, because Chinese Government has not disclosed country-level or sector-level ODF data. Even though some scattered in the official documents, the English translation of aid categories is confusing. To make a sound analysis, some

researchers started to study how to quantify the Chinese ODF, in general and Africa specifically. AidData's Media-Based Data Collection (MBDC) and Johns Hopkins's China Africa Research Initiative (CARI) provided overview of Chinese ODF in Africa (Strange et al. 2013; Atkins et al. 2017).

Three main differences from traditional donors drawn from previous literatures, and the need for sustainability transition is concluded from the existing literature.

The **first difference** is that China's ODA and OOF are almost equivalent, which is also a common practice of emerging donors, while traditional donors tend to offer more ODA (Vazquez et al. 2016). From 2010 to 2012, China provided USD 2.647 billions of concessional loans, equivalent to ODA, and USD 2 billion in export buyer's credit, and invested more than USD 0.5 billion, equivalent to OOF (FOCAC 2009).

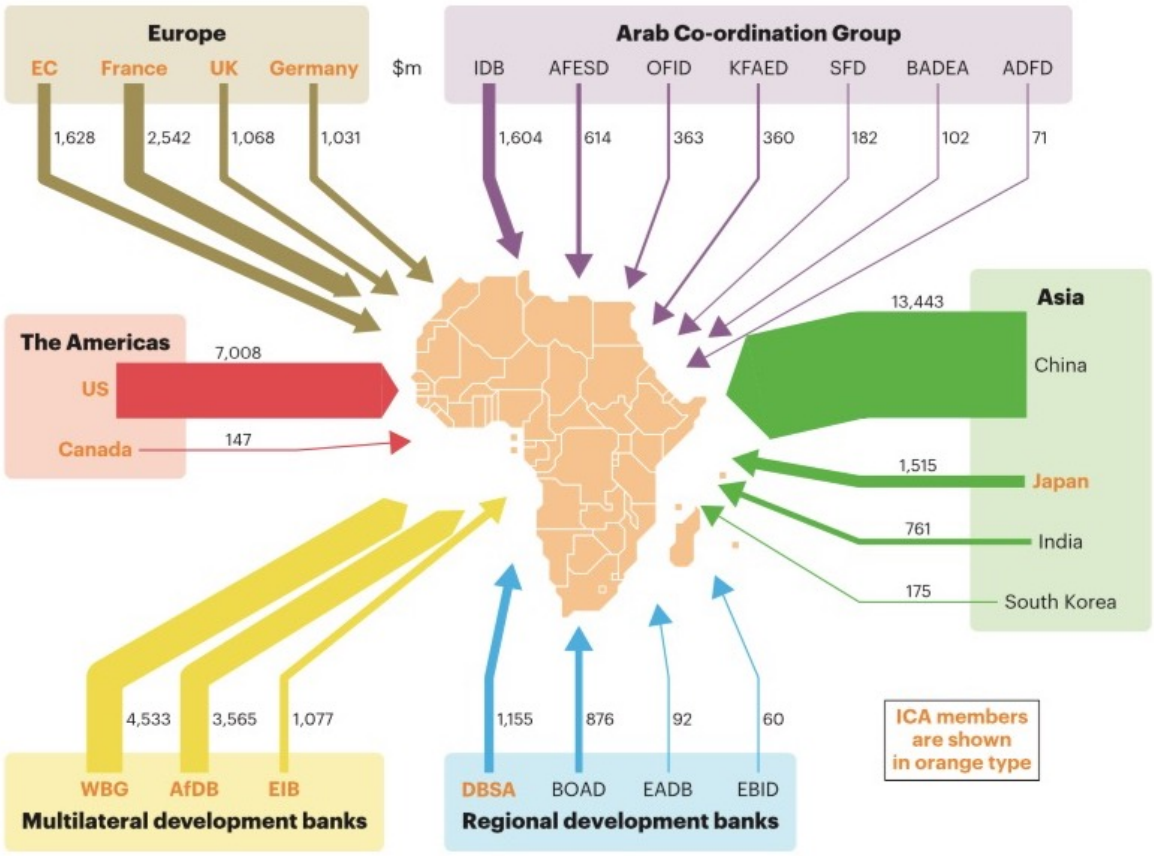

Figure 2.1 Financing flows into Africa's infrastructure in 2013

Note: the members of Infrastructure Consortium for Africa (ICA) include African Development Bank (AfDB), Development Bank of Southern Africa (DBSA), European Commission (EC), European Investment Bank (EIB), G8 countries (Canada, France, Germany, Italy, Japan, Russia, UK, US), Republic of South Africa and the World Bank Group. In 2011 all G20 countries were invited to join the ICA. The AU Commission, NEPAD Secretariat and Regional Economic Communities participate as observers at ICA meetings.
Source: ICA, 2014, Page 14, Figure 9.

The **second difference** is that, China largely focuses on financing the infra-system. For instance, China ranked the top in terms of infrastructure financing to Africa in 2013 with a total of USD 13,443 million (Figure 2.1), while the U.S., the second largest, provided USD 7,008 million (ICA 2014).

The **third difference** lies in the Chinese way of operating its development assistance, in terms of both actors and process. Study showed that, for the three types of Chinese aid – grant aid and technical assistance, concessional finance and interest-free loans, and debt relief – the multiple actors of Chinese governments and financial institutions follow different procedures and principles (Davies et al. 2008). Here only presents the flow of concessional loans since it involves most of the key actors of Chinese ODF. In cases where the loan is from the Export-Import Bank of China (hereafter China EXIM Bank) who is the only provider of Chinese Government concessional loan financing, Figure 2.2 outlines the process (Davies et al. 2008).

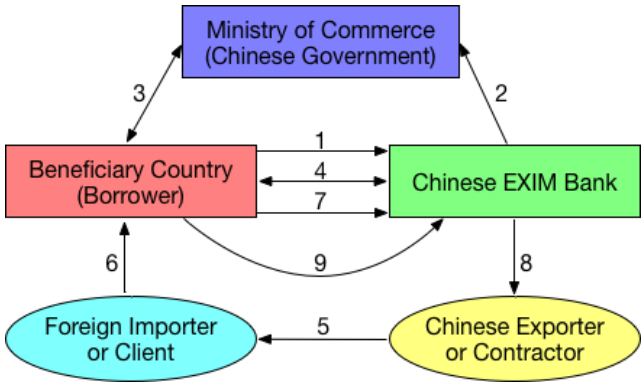

Figure 2.2 Structure of concessional loans by China EXIM Bank.
Source: Adapted from Davies et al., 2008, Page 18, Figure 3.

Note:

1. The government of the borrowing country (represented by its Ministry of Finance) submits an application to China EXIM Bank of no less than RMB 20 million (USD 2.4 million).
2. The Bank does an evaluation in the form of a feasibility assessment report of the application and the intended project and submits a recommendation to the Ministry of Commerce.
3. The Chinese Government signs a framework agreement with the borrowing country provided that the recommendation is accepted.
4. The borrowing country (represented by a minister of the borrowing government) signs a project loan agreement with the EXIM Bank (represented by a President or Vice-President of the Bank). The loan interest rate and grace period are separately negotiated, with repayment due semi-annually following loan negotiations.
5. According to the contractual terms, the Chinese contractors and exporters invoice the foreign executing agency requesting payment.
6. The foreign executing agency submits the invoice and progress report to the borrowing country government.
7. The foreign government submits a drawing application, invoice and progress report to the China EXIM Bank.
8. China EXIM Bank then disburses the funds to the exporter.
9. The foreign government pays the principal, interest, fees and loan repayments to China EXIM Bank.

According to China EXIM Bank's concessional loan requirements, Chinese contractors must be awarded the infrastructure contract financed by the loan (Davies et al. 2008). This policy is similar to the traditional donors', providing these companies with an entry point to set up a presence in the host markets (Davies et al. 2008). Another principle is that no less than 50 percent of the contract's procurement for equipment, materials, technology and services should come from China. The other donors have engaged in similar structures, and by most standards, the official 50 percent tie to Chinese procurement can be considered generous pointed out by Davies et al. (2008).

The concessional loan is denominated in Chinese Renminbi (RMB) and has a maximum maturity of 20 years. A grace period of 3-7 years may be granted, during which the borrower will only repay interest payments and not the principal. The interest rate, ranging between 2-4 percent, is subsidized by the Chinese Government (Davies et al. 2008), which is much higher than the interest rates of the DAC donors. While China EXIM Bank is the lead financial institution in concessional loans, other banks like the China Development Bank also provide other forms of finance (Davies et al. 2008), with the aim of facilitating trade and investment opportunities for Chinese companies overseas.

Besides the operational differences, the operation actors are also different. Traditional donors have formed their specific ODF organizations, such as the US Agency for International Development (USAID) for the US, the Department for International Development (DFID) for the UK, and the Japan International Cooperation Agency (JICA). These organizations implement, monitor and evaluate their ODF from financial, environmental and social aspects. However, China for now lacks this kind of organization. Although Figure 2.2 suggests the Ministry of Commerce is the only representative, the Ministry of Foreign Affairs also plays an important role. Some researchers suggest that the Chinese Government should merge all the functions related to ODF from many organizations into one integrated agency in order to be more transparent, effective and influential in the implementation and evaluation (Anshan 2012).

Due to these three differences, relations between China and the traditional donors in the field are also heated discussed by scholars, either rivalrous, complementary or even destructive (Grimm et al. 2010; Schiere 2010; Mawdsley 2010; Condon 2012; Grimm & Hackenesch 2016). Nonetheless, the relations discussion is likely to intensify with recent establishment of two financial institutions: first, the New Development Bank (NDB), a multilateral development bank founded in 2014 and operated by the BRICS states (Brazil, Russia, India, China and South Africa); and second, the Asian Infrastructure Investment Bank

(AIIB), an international financial institution proposed by China, regarded as a rival for the IMF, the World Bank and the Asian Development Bank (ADB) dominated by developed countries.

On one hand, the similar development experiences between China and African countries in combating poverty and the co-provision of aid, trade and investment as a package, make China and other emerging donors popular among the developing countries, and result in rising South-South Cooperation (Kaplinsky & Morris 2009, Cassel et al. 2010; Babaci-Wilhite et al. 2013). And this emerging way of providing aid, trade and investment has been regarded as effective for transformation (Lin & Wang 2017); On the other hand, the emerging donors' ODF operation and regulation, especially on transparency and environmental and social safeguards, are criticized since the DAC regulations are not binding on them (Grimm et al. 2011; Brautigam 2011a; Yuan et al. 2012), and there is a lack of systematic evaluation.

Additionally, the three differences marked by China's stress on infra-system investment in Africa triggered heated debate with the fact that China remains the country investing most in Africa's infrastructure (ICA 2014). One of the reasons could be its comparative advantage. Since 1999, China's construction sector has seen annual growth of 20 percent, making China the largest construction market in the world. The Chinese contractors have accounted for more than 30 percent by value of civil works contracts tendered by the World Bank and AfDB which makes them substantially more successful than any other contractors (Foster et al. 2009). Brautigam (2009) reckoned that the Chinese fills the gap where no much donors finance on infra-system, and the Chinese contractors could help increase competition given the high premium of European contractors.

Though Chinese ODF on infra-system is not perfect, it also proved to be helpful in achieving the SDGs. Hanauer & Morris (2014) summarized that many Africans praise China's contributions to their infrastructure while labor unions and civil society groups criticize Chinese enterprises for their poor labor conditions, unsustainable environmental practices, and job displacement. Nonetheless, Chinese-built infrastructure with Chinese ODF support helps to reduce the business costs and to expand the size of regional markets, increasing opportunities for profitable ventures by African and international investors.

At present the DAC donors are relating their ODF objectives and narratives to the 17 SDGs (DAC 2016). However, the multi-dimensional character of the SDGs is promoting the transformation of ODF, to expand engagement with a broader range of public and private partners, and apply sustainability consideration to improve their effectiveness. Sustainability transition is not only critical for traditional donors, but also emerging donors, particularly in terms of their ODF regulations on transparency and environmental

safeguard criteria which may decelerate sustainable development, despite their primary intent on promoting the sustainable transition in developing countries.

2.2 Sustainability transition study

Sustainability transition (ST) is a rapidly growing and influential research field, despite of its short history of only 15-20 years. Its definition has been widely acknowledged as "long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical system shift to more sustainable modes of production and consumption" (Markard et al. 2012). Infra-system sectors like energy supply, water supply and transportation can be regarded as socio-technical system which consists of actors and institutions, as well as technological knowledge.

2.2.1 Theoretical frameworks

In terms of theoretical development, so far four frameworks have achieved much prominence in the ST academia: 1) the Multi-level perspective (MLP) on socio-technical transitions (Geels 2002; Geels 2004; Geels & Schot 2010; Smith et al. 2010; Papachristos et al. 2013); 2) Strategic Niche Management (SNM) (Rip & Kemp 1998; Coenen et al. 2010; Raven et al. 2016); 3) Transition Management (TM) (Shove & Walker 2007; Loorbach 2010; Rauschmayer et al. 2015); and 4) Technological Innovation Systems (TIS) (Jacobsson & Lauber 2006; Hekkert et al. 2007; Bergek et al. 2008).

It should be noted that there is a broad range of other relevant theoretical approaches, such as evolutionary economic theory, actor network theory, social construction of technology, reflexive governance, and sociology of expectations. However, only the aforementioned four frameworks adopt "systemic views of far-reaching transformation processes of socio-technical systems" (Markard et al. 2012).

Multi-level perspective (MLP) on socio-technical transitions provide the fundamental conceptual framework for most ST research as well as the other three frameworks. It derives from the concept of technological regime, which was first proposed by evolutionary economists, referring to the prevailing successful designs predisposing innovators in firms towards development of certain marketable or feasible options but away from other less attractive options (Nelson & Winter, 1977). Rip & Kemp (1998) define a broader notion of technological regime with landscape view to produce a multilayered backdrop of novelty and irreversibility. Subsequent theoretical research further advanced the notion of socio-technical regimes (Geels, 2002; Geels, 2004; Genus & Coles, 2008; Smith et al., 2010; and Papachristos et al., 2013), by

incorporating ideas from sociology on relations between various types of institutions and rules and technology development and use, bolstered by several empirical explorations in parallel (Bree et al., 2010 on electric vehicles; Turnheim & Geels 2013, on British coal industry).

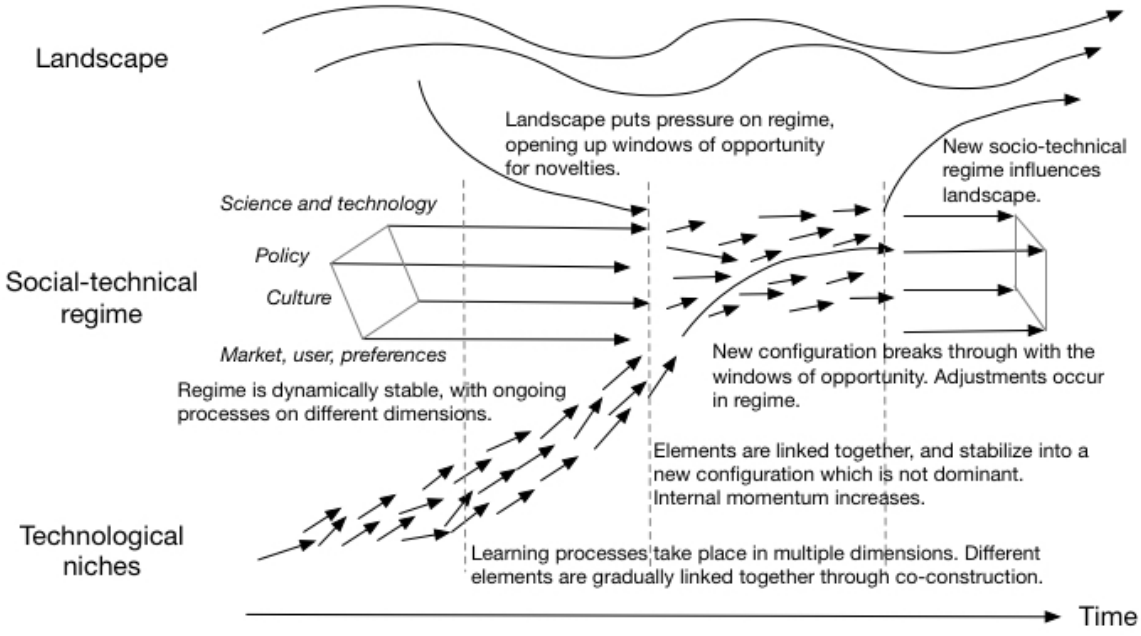

Figure 2.3 A dynamic multi-level perspective on system innovations.

Source: Adapted from Geels, 2004, Page 915.

Researchers typically apply MLP to analyze past episodes of transformational innovation at the macro-level (landscape), meso-level (regime) and micro-level (niche) (Figure 2.3). The niche is built up by a small group of actors pursuing partly differing activities from the regimes, and is a space prone for more radical innovations to occur at least at experimental level. The socio-technical regimes include formal or regulatory, normative, cognitive institutions within a technological and product regime, science regime, policy regime, socio-cultural regime, cultural regime, and users, markets and distribution networks which are dynamically stable (Geels, 2004). The landscape in turn is the mostly exogenous context, by definition out of the influence of niche, such as global trends on climate change. It can put pressure on existing regimes, and open up windows of opportunities for novelties. Meanwhile, the landscape is affected by socio-technical regimes (Geels, 2002).

The allure of MLP rests in its ability to capture the bigger picture in socio-technical transitions. However, it also has limitations, as many theories may emphasize too much niche-derived agency in

transitions and underemphasize the radical reforms in regimes (Smith et al., 2010), and the question of whether transitions are as tractable to policy-makers as implied (Shove & Walker, 2007). Nonetheless, it provides an analytical framework to depict the niche, regime and landscape dynamics.

The niche is a key concept in ST studies, considering its pivotal role in the emergence of novel technologies. Strategic Niche Management (SNM) is suggested as a way forward to trigger the regime shifts, such as the deliberate creation and support of such kinds of niches. Radical novelties emerge in "protected spaces" to shield from market selection. Protection can be provided in terms of subsidies by public authorities or strategic investments by companies (Geels, 2004). SNM theories believe that "protective spaces" by policies can make room for experimentation, proliferation, and maturation of early-stage technologies (Verbong et al., 2010; Bakker et al., 2015; Boon & Bakker, 2016; Raven et al., 2016), and the common existence of social, geographical, institutional and organizational proximity dimensions in niche development (Coenen et al., 2010). Experimentation is key due to its important role in creating niches.

Transition Management (TM) combines the work on technological transitions with insights from complex system theory and governance approaches (Markard et al. 2012). An instrumental, practice-oriented model for influencing ongoing transitions towards sustainable trajectory has been proposed and applied by TM researchers (Loorbach 2010). A prescriptive TM strategy was developed by Loorbach and Rotmans (2010): through action research and participation in regional and national policy projects, TM is operational as a combination of problem structuring and envisioning in multi-actor arenas, formulizing new coalitions, implementing agendas in experiments, and evaluating and monitoring the process.

Research on Technological Innovation Systems (TIS) is the fourth main framework, concerning the emergence of novel technologies and the institutional and organizational changes which have to be in parallel with technological development. There are also linkages with innovation systems at national and sectoral levels. The most influential conceptual refinement by TIS is the identification of key processes, functions, which need to run smoothly for the system to perform well (Hekkert et al. 2007; Bergek et al. 2008). Recent TIS studies have more focus on specific technologies (Hekkert et al. 2007), meaning that the analytical interest has shifted "from technological innovation contributing to the economic growth of countries to new technologies as nuclei for fundamental socio-technical transitions". As a result, less TIS literatures have been observed recently. One of the major contributions of TIS is that it replaced the narrow concept of market failures with a broader set of system failures, including poorly working networks, institutional failures, and infrastructure failures (Markard et al. 2012).

2.2.2 Actor and role theories

Theoretical findings in the ST field have been of great help to capture the bigger picture at the macro or systems level, but may be "at the expense of a more actor-oriented and agency-sensitive analysis" (Farla et al. 2012). For instance, the MLP has been criticized for weak conceptualization of actor issues and not paying attention to the conflicting interests in the transition process (Genus & Coles 2008). Niche-based approaches have also been challenged for emphasizing too much on planned, well-ordered and consensual management (Lovell 2007).

Actors and agency dynamics mostly exist in the research focusing on transitions governance which concentrates on multi-actor decision making, such as agency, governance mechanisms, power relations, underlying values and legitimacy (Avelino & Rotmans 2009; Wittmayer et al. 2017).

Various typologies for group actors involved in transitions have been identified. Farla et al. (2012) characterized the types of actors as policy makers, public authorities, firms and others. Avelino & Wittmayer (2015) distinguished four categories: state, market, community and third sector, and three other actors besides these four actors at difference levels of aggregation: individual actors, organizational actors, and sector level actors. Fischer & Newig (2016) identified another four typologies: 1) systemic typology, actors related to the MLP levels; 2) institutional typology, actors related to institutional domains; 3) governance typology, actors related to governance levels; and 4) intermediaries.

Farla et al. (2012) drew attention to the dynamic interactions between what actors do and what can be observed at the system level, and provided a closer look at the actor strategies, resources, and capabilities of individuals, firms and other organization, their impact on the overall system and transition process, and how these changes at the system level feedback into the strategies at the actor level. Fischer & Newig (2016) found that actors have been neglected in the literature in favor of more abstract system concepts, and revealed that actor roles in transitions are erratic, since their roles can change over time, and that actors can belong to different categories.

Wittmayer et al. (2017) argued that the changes in social roles of actors can be indicative of transition change in the social fabric, such as the changes in transitions of "single role", namely the role of a single actor, and "role constellation", namely the interactions of multi actors and the impacts onto their roles. This research decides to apply these terminologies in line with the existing literature in this field without creating new ones. Besides the creation and dissolution of a role, the change of a single actor's role could also be

analyzed by describing a shared role understanding at two time points, and analyzing the differences quantitatively or qualitatively. A "quantitative" role change denotes an addition or subtraction of activities and attitudes or a loss of power, while a "qualitative" role change denotes a change in activities and attitudes and the relative salience, or a reinterpretation of its meaning. Role constellation is defined as webs of roles, which interact, interrelate and co-evolve with one another with regard to one specific issue. Actors could make use of their roles purposefully in their interplays with others as a resource for thinking, acting and achieving political ends, which could be regarded as acts of agency and purposeful attempts of transition governance.

A literature overview suggests that the study on actors has two shortcomings: 1) it is mainly focused on specific empirical contributions, and only until recently have a few studies become concerned with actors and their interactions in transition study field (Avelino & Wittmayer 2015; Fischer & Newig 2016); 2) mostly focused on the governance aspects, such as the interactions of actors and contributes to purposeful attempts to achieve one certain goal, and less attention on the general understanding of the changing interaction and relations of actors, and how these are indicative for, and part of, sustainability transitions (Wittmayer et al. 2017).

To provide opportunities for multi-actor collaboration to deal with societal challenges and form a critical part of transition, social roles of these actors require further study, such as "how they are understood in society, how one role relates to another, how the roles and relations change over time, as well as how those occupying a given role come to terms with it and negotiate their own version thereof" (Wittmayer et al. 2017). Wieczorek (2017) also suggests that we untangle the dynamics of actors in experimentation, such as the negotiations and struggles between the actors, and how their access to resources and respective relational positions shape their capability to affect the design and outcome of the experimentation towards sustainability transition.

2.2.3 From developed to developing countries

In addition to the theoretical exploration, ST theories have been adopted in empirical cases. The expansion on geographical regions as well as domain coverages are explicitly illustrated by two systematic review papers on ST studies (Markard et al. 2012; Wieczorek 2017).

Markard et al. (2012), after examining a sample of 540 papers identified as ST scientific articles from 1998 to 2011, found a clear "European bias" in the then state of the field, with the Netherlands taking up

most of the papers with 9 percent, the UK with 8 percent, the US with 6 percent, and Germany with 5 percent. Though studies on ST in North Amercia, Japan, China and India also existed in the literature, they were still very much underrepresented in comparison with the European countries. In terms of sectors, the energy sector and renewable technologies represented the most dominant topic, with 36 percent of all papers, followed by research on transportation with 8 percent, water and sanitation with 7 percent, and food with 3 percent. The term "infra-system transition" appeared in the discussion on how infra-system research could learn from ST field, the role of infra-system in ST, as well as the difference in emphasis compared with the term "infrastructure" (Loorbach et al. 2010).

The "European bias" landscape has quickly changed in the last five years. Wieczorek (2017) identified 115 publications written between 2005 and 2016 which applied the ST frameworks to developing countries, from less than five publications every year before 2008 to about 15 publications annually after 2012. More diversified domains are explored, such as agriculture, mobility, water, though the energy sector still generated the most interests.

One of the reasons for the energy sector's domination might be the that ST theories at the early stage were regarded as relevant analytical frameworks for energy transition study, as well as the importance of energy sector in infra-system and the heated topic under the climate change discussions. Elzen et al. (2002) proposed the socio-technical scenario for exploration of the transition to a sustainable electricity supply, and examined two transition paths at European level: large-scale integration of renewables, and distributed generation.

Empirical analysis was firstly conducted on energy sectors in Netherlands (Verbong & Geels, 2007; Verbong et al., 2008), Germany and UK (Geels et al., 2016), and most recently Japan (Mori 2017). Though still underdeveloped in comparison with European countries, in recent years there has been growing interests in developing countries' energy transition (Marquardt et al. 2016 on Philippines and Morocco, Tigabu et al. 2017 on Kenya, Osunmuyiwa & Kalfagianni 2017 on Nigeria).

2.3 ODF for sustainability transition in developing countries

Considering the unneglectable influence of international development finance onto the sustainability transition of infra-systems for developing countries, some scholars tried to adopt ST theories to study the role of development finance in developing Asian and African countries.

Some, yet limited, empirical studies have been conducted; all of them have focused on the energy

transition. Hansen & Nygaard (2013) chose the palm oil biomass waste-to-energy niche in Malaysia, and argued that the donor interventions more often hinder radical changes in the niche development. Marquardt et al. (2016) wrote that donors cannot force the energy transitions in the Philippines or Morocco, but can be a driving force for testing alternative ways for electricity supply through niche level experiments and regime level interventions that are closely connected to the country's primary energy objectives.

Tigabu et al. (2017) analyzed the role of Official Development Aid (ODA) in the evolution of Technological Innovation Systems (TIS) related to improved cook stoves in both Kenya and Rwanda over the last 30 years, and found that the ODA has not fostered balanced and effective TIS. The main reason was regarded that the aid interventions only address a few actors without sufficiently considering their roles within the context of an emerging innovation system. Tigabu et al. (2017) also drew the lessons for development agencies, writing that they should recognize that innovation occurs in the context of an interacting network of actors affected by specific institutional structures.

Apart from these empirical studies, some theoretical conceptualization concerns the cross-fertilization possibilities of these two fields. Marquardt (2015) provides the groundbreaking discussions by arguing that Transition Management (TM) can be a useful analytical approach for clarifying how Official Development Finance (ODF) can stimulate transition towards sustainability.

Three crucial links between TM and ODF are identified (Marquardt 2015): 1) Common goals on sustainable development and sustainability represents the landscape vision for ST, and a fundamental driving force for ODF provision; 2) Focus on regime change, TM involves a regime change, and the assessment and evaluation of ODF often involves an overarching perspective which goes beyond the single project level effects; 3) Actors for change, TM stresses the key role of experts for change, and donors can be framed as such actors with time, energy and resources needed to create protected niche environments for innovations and transitions. Therefore, TM could frame ODF projects as local experiments where new socio-technical configurations grow and up-scale.

After systematically examining 115 publications on ST in developing countries, Wieczorek (2017) argued that further engagement with development studies could allow for a productive cross-fertilization. However, as recognized, the theoretical discourse concerning the actors and roles of international development finance by adoption of ST theories has not been much addressed by the scholars to date. And this dissertation aims to fill up this gap in the literature.

Chapter 3 ODF and sustainability transition in Kenya

This chapter illustrates the reason for choosing Kenya as the case, relevant background of Kenya, and the research questions, hypothesis, as well as approaches. This chapter aims to provide the case of Kenya so as to examine the role of ODF for infra-system's transitions towards sustainability in developing countries.

3.1 ODF and infra-system transition in Kenya

Kenya was chosen out of over 50 African countries for two reasons: 1) financing urgency and huge gap for its infra-system transition; 2) one of the top recipients in terms of ODF from DAC countries and China.

The Programme for Infrastructure Development in Africa (PIDA) formulated in 2010 by the African Union Commission (AUC) stated that East Africa, in comparison with other regions of Africa, requires the most finance (PIDA 2012), with the amount of USD 23.3 billion needed to carry out the projects recognized by its Priority Action Plan by 2020. Based on the Africa Infrastructure Country Diagnostics (AICD) Report for five African countries: Côte d'Ivoire, Ghana, Kenya, Nigeria, and Senegal, a World Bank report (Shendy et al. 2015) highlights the existing inefficiencies and infra-system financing gaps.

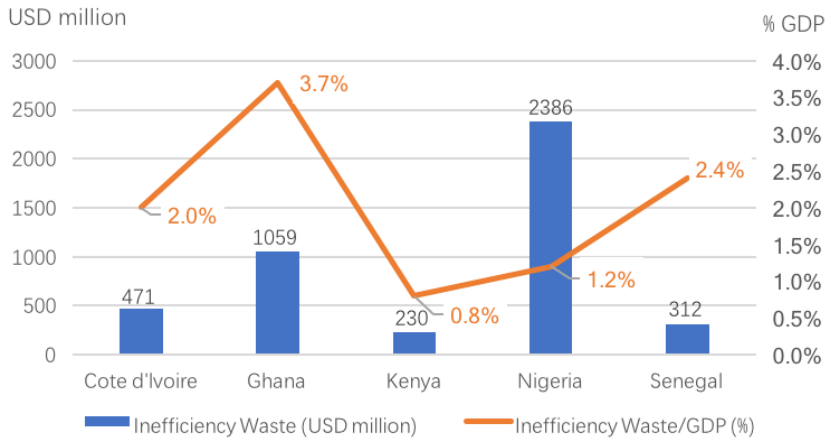

Figure 3.1 Infra-system inefficiency waste in selected African countries.

Source: Adapted from Shendy et al., 2015, Page 3, Figure 2.

Figures 3.1 displays the size of additional resources that could be recovered annually by improving efficiency. Provided that these inefficiencies could be fully addressed, Figure 3.2 shows the annual financing

gap needed to be met over the next 10 years to improve infra-system to the level of a middle-income country such as Mauritius. While Kenya exhibits the lowest level of infra-system inefficiency waste, totaling USD 230 million per year (0.8 percent of GDP), the country's funding gap is the highest among all five countries, totaling USD 2,094 million (7.0 percent of GDP).

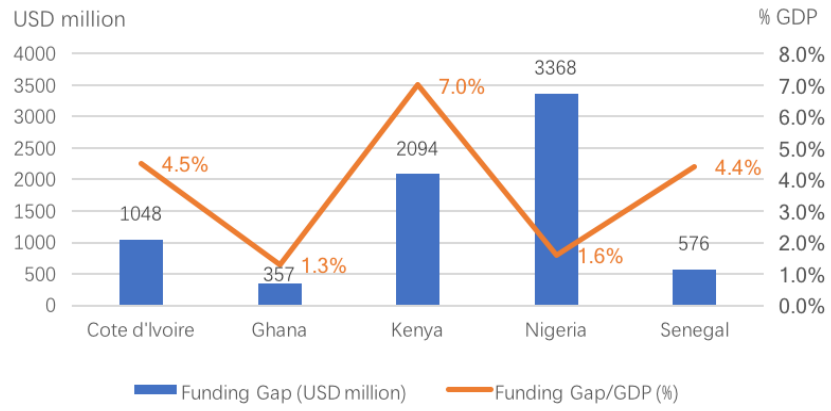

Figure 3.2 Infra-system funding gap in selected African countries.

Source: Adapted from Shendy et al., 2015, Page 3, Figure 3.

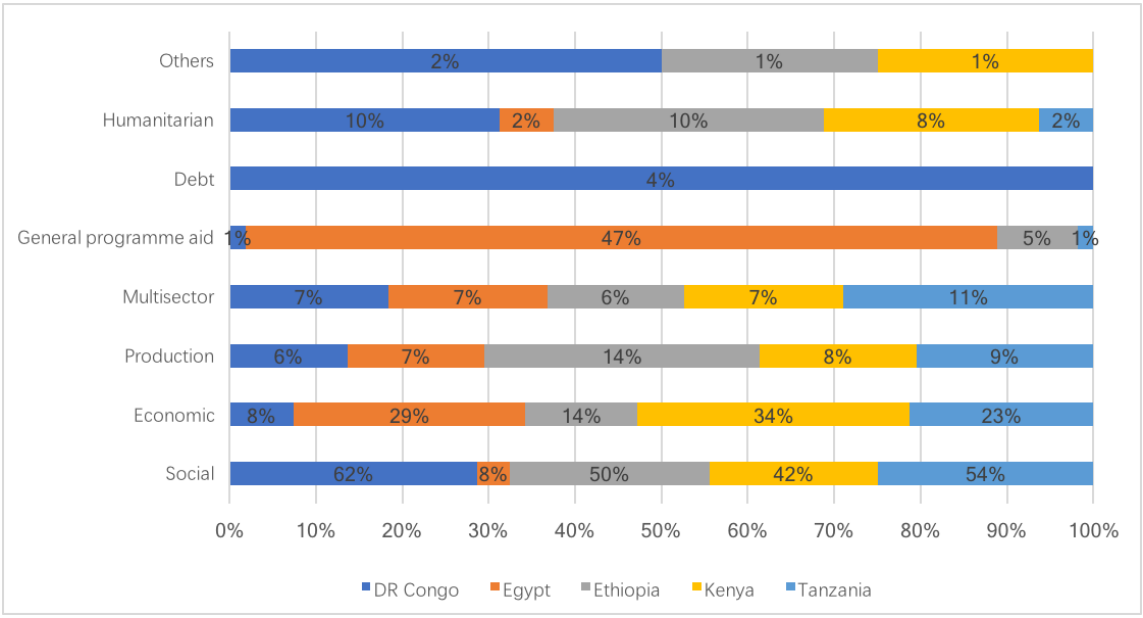

Figure 3.3 ODA to top five recipients in Africa by sector in 2015.
Note: as a percentage of total ODA committed for each country.
Source: Adapted from OECD, 2017, Page 10, Figure 2.3.1.

The other reason is that Kenya ranks as one of the top ODF recipients from DAC countries as well as China, even though it appears that this ODF is not enough able to fill the infra-system financing gap. In 2015,

Kenya, with USD 2,474 million, ranked Fifth in terms of net ODA disbursements from DAC countries (OECD 2017b), after Ethiopia (USD 3,234 million), Democratic Republic of Congo (USD 2,599 million), Tanzania (USD 2,580million), and Egypt (USD 2,488 million). However, in terms of ODA commitments to the economic sector including transport, communications, energy and banking services in 2015, Kenya was the top, with 34 percent of total ODA from DAC countries committed to Kenya's economic sector (Figure 3.3).

As shown in Table 1.3, Kenya ranked the third among all African recipients in terms of loans from China from 2000 to 2015, and ranked at the top in terms of loans for its transportation sector, and fourth in terms of loans for its energy sector (Atkins et al. 2017). Though the official Chinese ODF data to Kenya's infra-system is unavailable, several large infrastructure projects may tell part of the story. The Nairobi-Mombasa standard gauge railway with a length of about 600 kilometers, the first modern railway in Kenya, was constructed and financed by Chinese within two years. It is the largest infrastructure project since Kenya's independence, with total investment of USD 3.8 billion. The proposed High Grand Falls Dam, which will be Kenya's largest dam, is expected to hold over 5.6 billion cubic meters of water that will be used to irrigate over 250,000 hectares of land and produce over 700 MW of electricity, and is being constructed by Chinese companies with Chinese financial support. The High Grand Falls Dam is one part of the Kenya Shilling (KES) 2.7 trillion (equivalent to about USD 26.1 billion) Lamu Port and Southern Sudan-Ethiopia Transport Corridor (LAPSSET) projects aiming to help Kenya achieve its Vision 2030. And Chinese government has made continuous financial commitments to support the realization of the Kenyan Vision 2030 upon official meetings.

3.2 Background of Kenya

The Republic of Kenya (hereafter Kenya) lies across the equator in east-central Africa, on the coast of the Indian Ocean. Kenya borders Somalia to the east, Ethiopia to the north, Tanzania to the south, Uganda to the west, and South Sudan to the northwest (Figure 3.4).

Kenya covers an area of 582,646 km^2, and has a population of 41.8 million in 2013 (KNBS 2014), with an annual growth rate of 2.11 percent (Index Mundi 2014). The capital is Nairobi. The majority of the Kenyans are Christian, with 45 percent Protestant and 33 percent Roman Catholic. The 10 percent who are Kenyan Muslims live mainly in the coastal region. About 500,000 people are Hindu (KPMG 2012).

The official languages are Swahili and English, yet 62 languages are spoken across Kenya (KPMG

2012). Over 70 distinct ethnic groups live in Kenya (KPMG 2012). The largest ethnic groups are the Kikuyu (22 percent), Luhya (14 percent), Luo (13 percent), Kalenjin (12 percent) and Kamba (11 percent) (Index Mundi 2014). The Kikuyu, who were most actively involved in the independence, are disproportionately represented in public life, government, business and the professions. The Luo are mainly traders and artisans. The Kamba are well represented in defense and law enforcement. The Kalenjin are mainly farmers. Although a recognized asset, Kenya's ethnic diversity has also led to disputes. Interethnic rivalries over Kikuyu dominance in politics and commerce have hindered national integration (African Studies Center 2014).

Figure 3.4 Map of Kenya.

Source: Encyclopædia Britannica, 2017, www.britannica.com/place/Kenya (accessed on December 28, 2017)

The life expectancy in Kenya is 64 years old, and 87.4 percent of the population were literate as of 2010. The infant mortality rate is 40.71 per 1,000 live births. The HIV prevalence rate is 6.1 percent (Index Mundi 2014). As for women advancement, until now there have been few women in prominent positions, though women are guaranteed at least a third of parliamentary seats in the constitution (New Internationalist 2010).

Kenya's economy is service-based: in 2013, agriculture contributed 20.7 percent of GDP, industrial

sector 15.9 percent, and services 63.4 percent with the main exports being tea, horticultural products, coffee, petroleum products, fish, and cement (AfDB 2014). Tourism is the second largest foreign revenue earner after tea (Turana 2013). About 75 percent of the work force is engaged in rain-fed agriculture, mainly as subsistence farmers (KPMG 2012). Income inequality is a problem. For 90 percent of Kenyans, the average wage is 15,000 (KES) per month, equivalent to USD 170, mainly for workers and peasants in urban and rural areas. About 9 percent belong to the emerging middle class, with income averaging a far higher 100, 000 KES per month, equivalent to USD 1,100 (Development Policy Management Forum 2014).

Kenya became a British protectorate in 1890 and a Crown colony in 1920, called British East Africa (KPMG 2012). After its independence in 1963, Kenya followed a pro-Western free-market course that contrasted with the African socialism propounded by its neighbor Tanzania (New Internationalist 2010). Kenya remained one-party after the death of Kenya's first president, Jomo Kenyatta, in 1978 and his replacement by Daniel Moi. A failed coup attempt in 1982 resulted in the consolidation of power of the Moi regime. Internal pressure, in combination with Western encouragement for multiparty democracy in Africa in the 1990s, led Moi to accept that Kenya should adopt multi-party elections (New Internationalist 2010).

In 2002 Mwai Kibaki became the president after overturning the Moi ruling party, with the agreed condition by the two principal political parties that they would run the government together. However, both parties failed to gain a consensus on government operations afterwards, which resulted in the 2007 general elections. Kibaki's Party of National Unity won, but irregularities were found in the vote counting, leading to riots across Kenya in which over 1,000 people died (New Internationalist 2010). With UN intervention, Raila Odinga of the Orange Democratic Movement Party became the prime minister under Kibaki's presidency, and a Grand Coalition was established, in which the two political parties share power equally with 41 cabinet ministers, including the prime minister and his two deputies (New World Encyclopedia 2014).

A constitutional change was considered to eliminate the position of prime minister and reduce the powers of the President. In 2010 the proposed constitution which devolves power to local authorities was approved in a referendum (New World Encyclopedia 2014). It is important to mention that the devolving of power to local authorities means that Kenya replaced the former Provincial Administration with a new governance system – the National Administration. However, studies show that the Provincial Administration has not changed in size, structure, or function, contrary to the goals of the constitution (Hassan 2013).

In the Provincial Administration system, Provincial Commissioners and District Commissioners were appointed by the president. District Officers, Chiefs, and Assistant Chiefs (Sub-Chiefs) were appointed by

the Ministry's Permanent Secretary. The National Administration system posts an administrator to each administrative tier of government, absorbing District Commissioners, District Officers, Chiefs, and Assistant Chiefs, and creates a new administrative post of County Commissioner at the county-level to absorb the Provincial Commissioners (Hassan 2013). Critics contend that the Provincial Administration system persists because of the provincial administrators' attempt to protect their material interests (Hassan 2013).

Under the 2010 constitution and with Kibaki prohibited from running for a third term by term limits of president, Deputy Prime Minister Uhuru Kenyatta, the son of the first Kenyan President won the vote and became the fourth Kenyan President in 2013 (New World Encyclopedia 2014).

Kenya had a peaceful political transition following the elections in 2013 and started to implement a devolved governance system. Recent discoveries of natural resource deposits, especially petroleum, have the potential to promote Kenya's economic growth (AfDB 2014). Meanwhile, in 2013 the Kenya Government launched its Second 5-year Medium Term Plan for the period 2013-2017, along with "Kenya Vision 2030," which consists of many large-scale projects including the Lamu Port construction project, aiming to elevate Kenya to the ranks of middle-income countries by 2030 (AfDB 2014).

The initial period of rapid economic growth to the middle 1970s was followed by a period of stagnation that persisted until the 2000s and then modest growth for the last decade. With around USD 840 in 2012, Kenya's average per capita income is only about half of Africa's average of USD 1,600 (AfDB 2014). Twenty-two African economies are now above the USD 1,000 middle-income threshold, yet Kenya is ranked 24th in Africa and remains in the low income group, with almost half of the people living below the poverty line and high unemployment, especially among the youth (AfDB 2014).

With regard to recent growth performance, GDP grew by an annual average of 3.7 percent over the last five years. A study conducted by the African Development Bank (AfDB 2014) suggests that Kenya's infrastructure connectivity with its neighbors is improving but remains under considerable pressure; meanwhile, infrastructure investments have the potential to help transform the economy, but costs remain high. Therefore, international ODF could help Kenya achieve the goal of sustainable development.

3.3 Research question and hypothesis

Previous sections briefed on the ST theories and empirical findings, and affirmed the possibilities and significances of integrating the two fields of study on ST and ODF. Following the actor role theories and MLP analytical framework in ST studies, as well as the suggestion on further untangling the dynamics of

actors in experimentation and up-scaling to regime changes, such as negotiations and struggles among actors (Wieczorek 2017), this research is conducted to investigate the following: ***How can ODF, from both traditional and emerging donors, at the niche level affect the rules and institutions at the regime level for the infra-system's sustainability transition in Kenya?***

Wieczorek (2017) reviewed the role theories dating back to the 1930s, and, based on three different ontological perspectives (functionalist, interactionist and constructivist), described the role as "a set of recognizable activities and attitudes used by an actor to address recurring situations", which is "socially constructed and open to negotiation and change". He argued that changes in the actors' roles can be indicative of changes in the broader social fabric, and can provide new opportunities for multi-actors' collaboration to tackle societal challenges and then form part of transition.

A "quantitative" single actor's role change denotes an addition or subtraction of activities and attitudes or a loss of power, while a "qualitative" single role change refers to a change in their activities and attitudes and the relative salience, or a reinterpretation of its meaning. A role constellation is defined as webs of roles, which interact, interrelate and co-evolve with one another concerning one specific issue. Actors could make use of their roles purposefully in their interplay with others as a resource for thinking, acting and achieving political ends, which could be considered acts of agency and purposeful attempts of transition governance.

Mindful of these concepts, the research raises its hypothesis concerning the official development finance: ***it is only when donor actors change their single roles and play role constellation among donor and recipient actors with sustainability perspective that their niche projects motivate sustainability transition of recipient's infra-system regime. Focusing on either role change or role constellation, not to mention the sustainability perspective is not enough for donors to design their ODF towards the goal.*** If the single role is changed with sustainability concerns, and the role constellation is active and in line with sustainability, the donors motivate regime transition through niche projects; if the single role is not changed with sustainability concerns, or the role constellation is inactive, the donors hinder sustainability transition.

The research deploys three individual case studies in Kenya to provide empirical justifications to the above proposed hypothesis. As the background introduced in Chapter 1 due to the urgency of infra-system transitions for African countries, the involvement of multi-donor actors in the African continent including emerging donors like China, and the significance of Kenya which requires the international ODF for its infra-system's transition, this research will examine the dynamics of single roles and role constellation of donor actors concerning their sustainability perspectives in Kenya's infra-system sustainability transition

with three cases:

1. ***Chinese donor*** *motivates or hinders the sustainability transition of Kenyan infra-system regimes by changing its* ***single role*** *quantitatively or qualitatively, and* ***role constellation*** *with Kenyan actors.*
2. ***Traditional and Chinese donors*** *motivate or hinder the sustainability transition of Kenyan infra-system regimes by changing their* ***single roles*** *quantitatively or qualitatively, and* ***role constellation*** *among themselves.*
3. ***Traditional and Chinese donors*** *motivate or hinder the sustainability transition of Kenyan infra-system regimes by* ***role constellation*** *between the donors and Kenyan actors.*

3.4 Research approach

With the questions and hypothesis in mind, the next step is to find suitable case studies in the Kenyan infra-system which involves such kinds of dynamics and interactions of donors and recipient actors, so as to justify the hypothesis. The research will focus on two infra-system domains: transportation sector and energy sector (Figure 3.5).

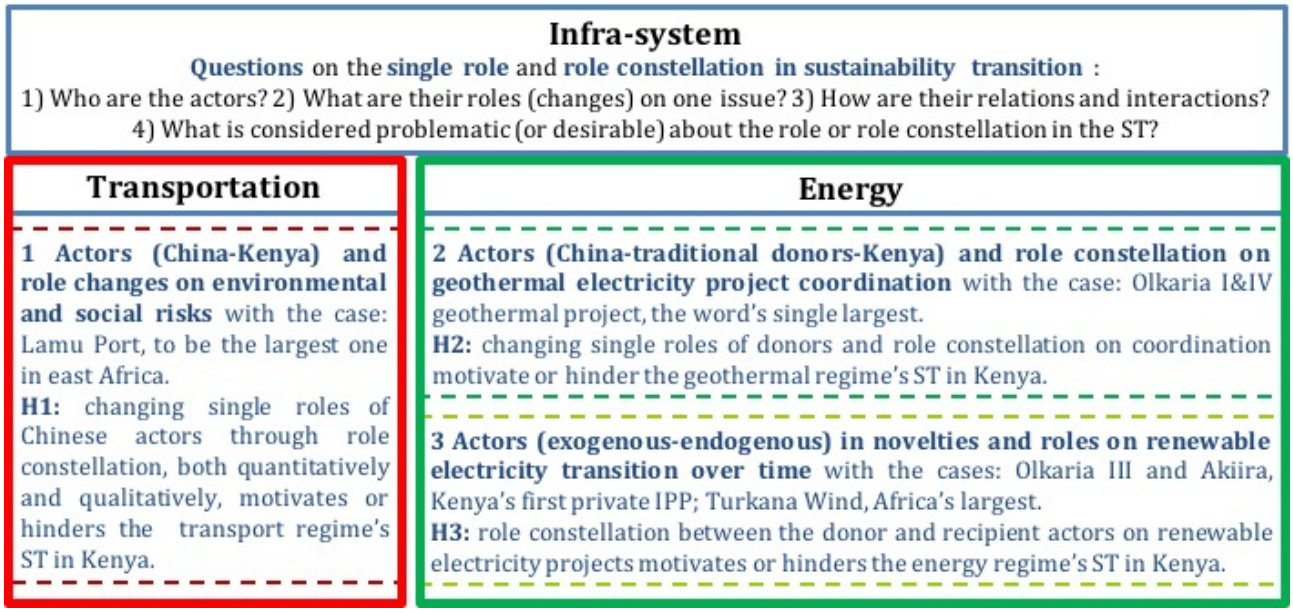

Figure 3.5 Approaches of analyzing the international infra-system finance in Kenya

Source: Author

To examine the role change of Chinese ODF actors concerning potential environmental and social risks, Lamu Port is selected as it has Chinese involvement in both construction and financing. As the starting point

of the Lamu Port and Lamu Southern Sudan-Ethiopia Transport Corridor (LAPSSET) projects, it will be the largest port in east Africa, so its influence on sustainability will be significant.

In terms of the port project, one of the most direct sustainability issues is the potential environmental and social risks (ESRs) to be induced by the construction. It is regarded as international practice that ODF providers, such as the bilateral and multilateral development agencies, establish relevant ESRs safeguard policies, and mitigate the potential negative ESRs in the project cycle, such as the "Environmental, Health, and Safety Guidelines for Ports, Harbors, and Terminals" by World Bank (IFC 2017). In this regard, China's ODF has been criticized for nullifying traditional donors' long-term efforts toward promoting good governance and environmentally sustainable development of recipient countries (Michel & Beuret 2010).

Therefore, the Lamu Port seems suitable to examine the role of Chinese actors and interactions with Kenyan actors concerning potential ESRs issues and mitigation roles. To capture the real situation and present its status at one point in time, a field survey in the Lamu region was conducted in November 2013, covering 35 community members, and 22 in-depth interviews were carried out, with 19 interviews in Nairobi from September to December, 2013, one in Beijing in April, 2014, one in Moscow in May, 2014, and one remotely in November, 2017.

For the energy sector, renewable energy is targeted given its prominence for sustainability for the country. Kenya is well-endowed with renewable energy. Some 14 potential geothermal sites are located along the Great Rift Valley with a potential of 7,000-10,000 megawatts (MW), the highest potential in Africa. Kenya was also the first country in Africa to adopt geothermal in 1954. Naivasha region hosts the single largest geothermal project in the world – the Olkaria I and IV (280 MW), and the first private sector greenfield geothermal project in Africa – the Akiira (70 MW). Meanwhile, Lake Turkana region in 2015 saw the construction of the largest single wind power project in Africa, with an expected installation of 365 wind turbines, and a total of 310 MW of wind energy to the national grid upon completion in 2017 (LTWP 2017).

To examine the role change and role constellation of traditional and Chinese donor actors, the Olkaria I and IV geothermal project is selected due to its involvement of multi donor actors, with the aims to uncover the interplay of Chinese and traditional donors in one geothermal project, and to review the dynamics of single role change and role constellation in the process at one point and over time towards the sustainable transition of Kenya's geothermal sector.

Examining the role change of international ODF donor actors and their role constellation with recipient actors requires a boarder range of analysis of both exogenous donor actors and endogenous recipient actors

at the niche and regime levels. The research examines the renewable electricity sector in Kenya as a whole, and retrospectively reviews the engagement of international donors in Kenya's renewable electricity development from 1954 until 2016, so as to examine the changes of single role and role constellation for actors from both sides, and the impacts on renewable energy regimes, as well as challenges for future sustainability transition.

In-depth interviews, as well as archival and literature review, were adopted to test the second and third hypothesis, with five conducted in Nairobi in 2015 (two in March, and three in September), one in London in October, 2016, and three in Washington DC in December, 2016. Detailed information on the interviews are presented in the individual chapters respectively.

Besides the specific research questions for hypothesis, each case will also provide answers to some common questions based on the actor and role theories by Wieczorek (2017) : 1) Who are the actors? 2) What are their roles (changes) on one issue? 3) How are their relations and interactions? 4) What is considered problematic (or desirable) about the role or role constellation in the ST? And if the interactions do not exist among the niche-regime-landscape levels, the analysis will only focus on actor and role study.

Chapter 4 Chinese ODF on port project and sustainability concerns

The transportation sector has absorbed the most of Chinese official development finance (ODF) in Africa, and Kenya witnesses some of the representative projects, such as the completed Nairobi-Mombasa standard gauge railway, the first modern railway in Kenya, and the under-construction Lamu Port, to be the largest one in Kenya and east Africa. Large transportation projects may induce negative environmental and social risks (ESR), yet the projects upon completion have huge potential to improve local mobility and help the infra-system transition. Concerning these ESRs, international donors have formed a general consensus on the mitigation regulations. However, Chinese ODF faces criticism on its ESR performance.

This chapter focuses on Lamu Port, a Chinese ODF financed project, as a case to examine whether Chinese ODF actors changed their roles towards sustainability, how is the role constellation with Kenyan actors, and explore how the Chinese ODF could help the transport regime's transition towards sustainability. Section 4.1 introduces the project, potential ESRs, existing mitigation institutions, and re-visits the research question and hypothesis. Section 4.2 identifies the actors, and methodologies. Section 4.3 examines the actors' roles and changes. Section 4.4 evaluates their relations. Section 4.5 explores challenges towards sustainability transition and the coordination feasibilities. And Section 4.6 summarizes the chapter.

4.1 Introduction

4.1.1 Chinese financed transportation projects in Kenya

Kenya's relationship with China dates back to the 15th century. Chinese navigator Zheng He traveled along the Indian Ocean and the Red Sea to East Africa, established the Maritime Silk Road, and enhanced trade between China and other parts of the world. Trade between Kenya and China in recent years has seen unprecedented growth – China has become the second largest trade partner to Kenya and its No. 1 source for foreign direct investment. Bilateral trade between the two countries has grown 30 percent annually in recent years and is now worth USD 2.84 billion (MFA 2013).

Transportation development is critical for advancing economic growth, and with more infrastructure construction Kenya can be a transport hub for the region. Various Chinese companies, both state-owned and private, are investing in Kenya. The companies mainly carrying out infrastructure construction are China Road and Bridge Corporation (CRBC) and China Wu Yi Kenya Company (Wu Yi).

CRBC is a subsidiary company of China Communications Construction Company (CCCC). CCCC is a Chinese Central Government Directly Owned Enterprise (the highest level of state-owned company) and World Top 500 Enterprise, focusing on overseas projects. CRBC has branches in 20 African countries, and has operated in Kenya since 1984. CRBC won a USD 484 million contract for building the first three berths in Lamu Port, the study area in this research. CRBC has also built the standard gauge railway line between Mombasa and Nairobi with total investment of USD 4.2 billion, as well as the South Ring Road in Nairobi by investing USD 200 million. In the past, it also won the USD 66.7 million contract of expanding the Mombasa Port.

Wu Yi is a subsidiary company of Fujian Construction Engineering Group, a state-owned company directly managed by Fujian Province of China, rather than the Central Government. The first expressway (Nairobi-Thika) in Kenya was completed by Wu Yi in 2012.

4.1.2 Lamu Port project

Lamu Port is the first important component of the Lamu Port-South Sudan-Ethiopia Transport (LAPSSET) Corridor Project, a flagship project of "Kenya Vision 2030" set by the Kenyan Government. Lamu Port will be the starting point of a regional transport corridor to traverse eastern Africa, as well as central Africa.

Lamu County is located on the northern coast of Kenya, and is one of the six counties in the coastal region of Kenya. It borders Tana River County to the southwest, Garissa County to the north, Republic of Somalia to the northeast and the Indian Ocean to the South. The county has an area of 6,273.1 km² including the mainland and over 65 islands, and the total coastline length is 130 km (Lamu County Government 2013).

Lamu Island (marked by a red star in Figure 4.1) is where the county government is located. Lamu old town on Lamu Island is the oldest existing Swahili Settlement in the world, and is recognized as UNESCO World Heritage Site (Save the Lamu 2014). Lamu County also has high biodiversity with two national reserves: the Dodori forest reserve and Kiunga marine reserve (marked by red circles in Figure 4.1). These are home to a variety of mammals and birdlife, various species of mangrove forest, valuable coral reefs, and endangered sea turtles (Save the Lamu 2014).

Lamu County lies between an altitude of zero and fifty meters above sea level. Some areas on the coastal line even experience floods during high tides every day. The county can be subdivided into two livelihood zones: the rich agricultural and livestock zones in the mainland and the fishing and marine zones (Lamu County Government 2013). The annual temperature ranges between 23℃ and 32℃. High

temperatures are experienced from December to April while low temperatures occur from May to July. Lamu has a bimodal rainfall pattern, with long rains from mid-April to the end of June, and short rains in November and December. The short rains are generally unreliable, and agricultural output during the period of the long rains account for 80 percent of the annual crop production (Lamu County Government 2013).

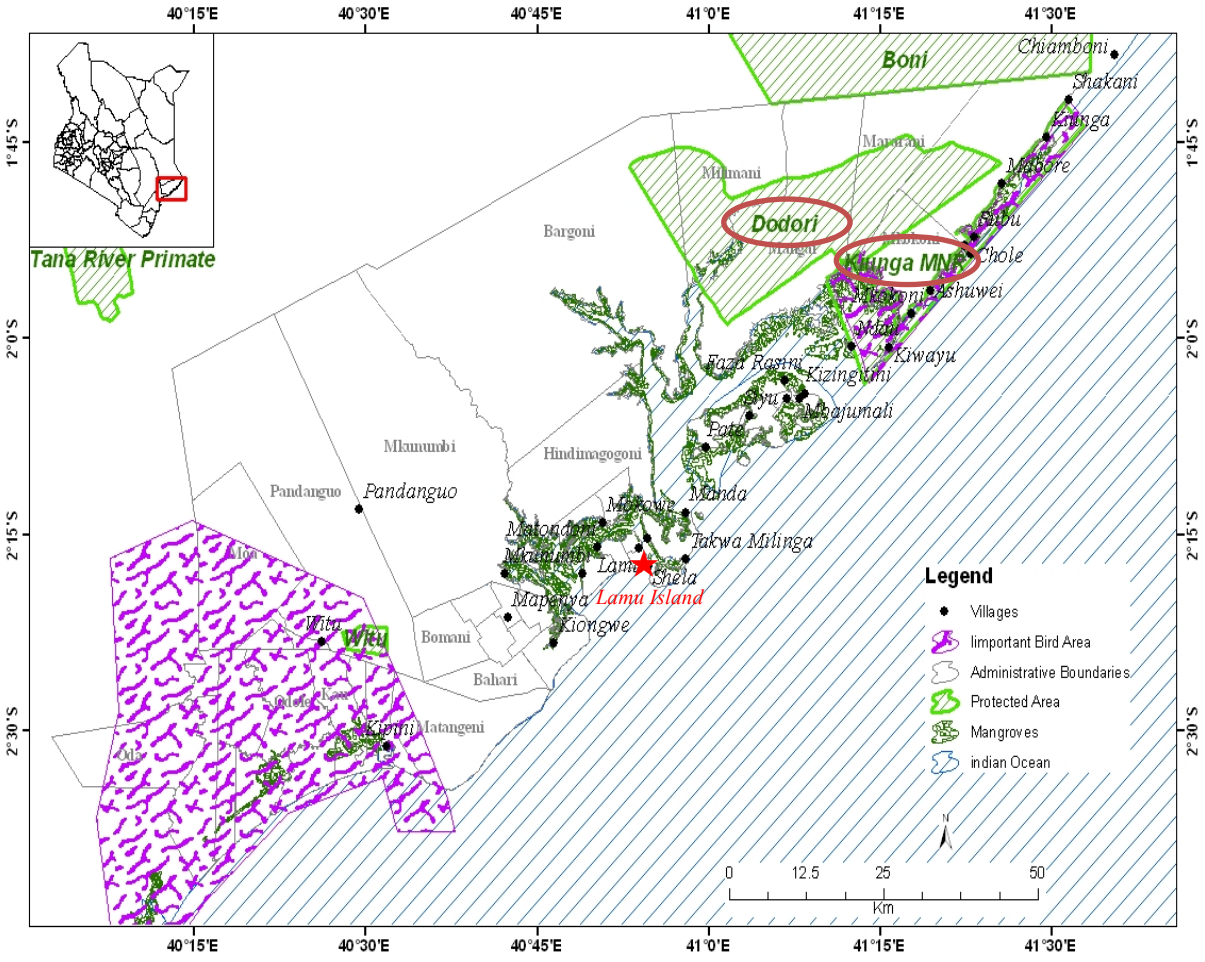

Figure 4.1 Lamu and the key habitats.
Source: WWF, 2011, Page 13, Figure 2.2.

The population of Lamu numbered 112,251 in 2012 (Lamu County Government 2013). Over 97 percent is Muslim. There are four main indigenous communities: the Bajuni, Orma, Sanye and Boni (Aweer) (Save the Lamu 2014). The Bajuni lives on fishing, farming, and, more recently, tourism-related activities. The Orma are pastoralist, while the Sanye and Boni are hunter-gatherers living off the forest and farming (WWF 2011).

Lamu County is geographically adjacent to Somalia, home to a militia of extremist Islamists called the al-Shabab. In response to Kenyan Government's sending troops to Somalia, the al-Shabab carried out a

deadly attack on a shopping center in Nairobi in September 2013, which resulted in at least 67 deaths. In June 2014, the al-Shabab attacked Mpeketoni, a Christian town near the Lamu Island. About 65 locals were slaughtered, most of whom were non-Muslims, which turned Kenya to a "war zone" (The Economist 2014).

Kenya's tourist industry, providing 15 percent of GDP in recent years, has been badly affected by the terrorist attacks. Lamu, with no major industry, heavily depends on income from tourism (Lamu County Government 2013). After the attacks, the British and other foreign governments sent out warnings to tourists to evacuate this region. The resorts and hotels on Lamu Island were reported to be virtually empty, and the operators admitted that it could take years to restore visitor confidence (The Economist 2014). To ease the concerns, especially among investors, that attacks would interrupt Lamu Port construction, especially from investors, the Kenyan Government re-stressed confidence to combat terrorism and willingness to continue the project.

To inject a growth value of two to three percent of GDP into economy, the Kenyan Government, supported by other neighboring countries, launched the LAPSSET Corridor Project (Kasuku 2012). The project, as shown in Figure 4.2, includes the construction of a port, a railway line, highway, crude oil and product pipeline, oil refinery, resort cities and airports, with an estimated total investment of USD 29.24 billion (Kasuku 2012).

The project will help create a regional transport corridor to traverse eastern and central Africa. Countries directly concerned with the project are Kenya, Southern Sudan and Ethiopia. Nearby Cameroon, Central African Republic, Uganda and Rwanda are also indirectly concerned, because the project belongs to one part of the Great Equatorial Land Bridge that connects the East and West coast of Africa (Figure 4.3).

The only port in Kenya, the Port of Mombasa has served as regional port and principal gateway for many landlocked countries as well as a major source of revenue for the Government. Competition from other regional ports such as Djibouti Port (Djibouti), Port Salala (Oman), Jeddah Port (Saudi Arabia), Dar es Salaam (Tanzania) and Port of Ngcuqa (South Africa) has put the Port of Mombasa under pressure to expand to deal with increased traffic and if not addressed could relegate the Port of Mombasa to become a feeder port. Currently the Port of Mombasa is undergoing an expansion program to remain competitive in the region. Studies have indicated that Mombasa port is nearing its saturation point and construction of another port is justifiable for Kenya (Kenya Ministry of Transport 2013).

As the first step of the LAPSSET Project, Lamu Port, with 32 berths in total, is estimated to have a total cargo volume of 13.5 million tons in 2020 and 23.9 million tons in 2030 (Japan Port Consultants &

BAC/GKA JV Co. 2011). The Lamu Port will allow Kenya to remain competitive against other regional ports, and is expected to function in the long run as one of the major ports on the East Coast of Africa, given the potential for its transport corridor to extend to Rwanda, the Democratic Republic of Congo (DRC) and even Cameroon (Kenya Ministry of Transport 2013).

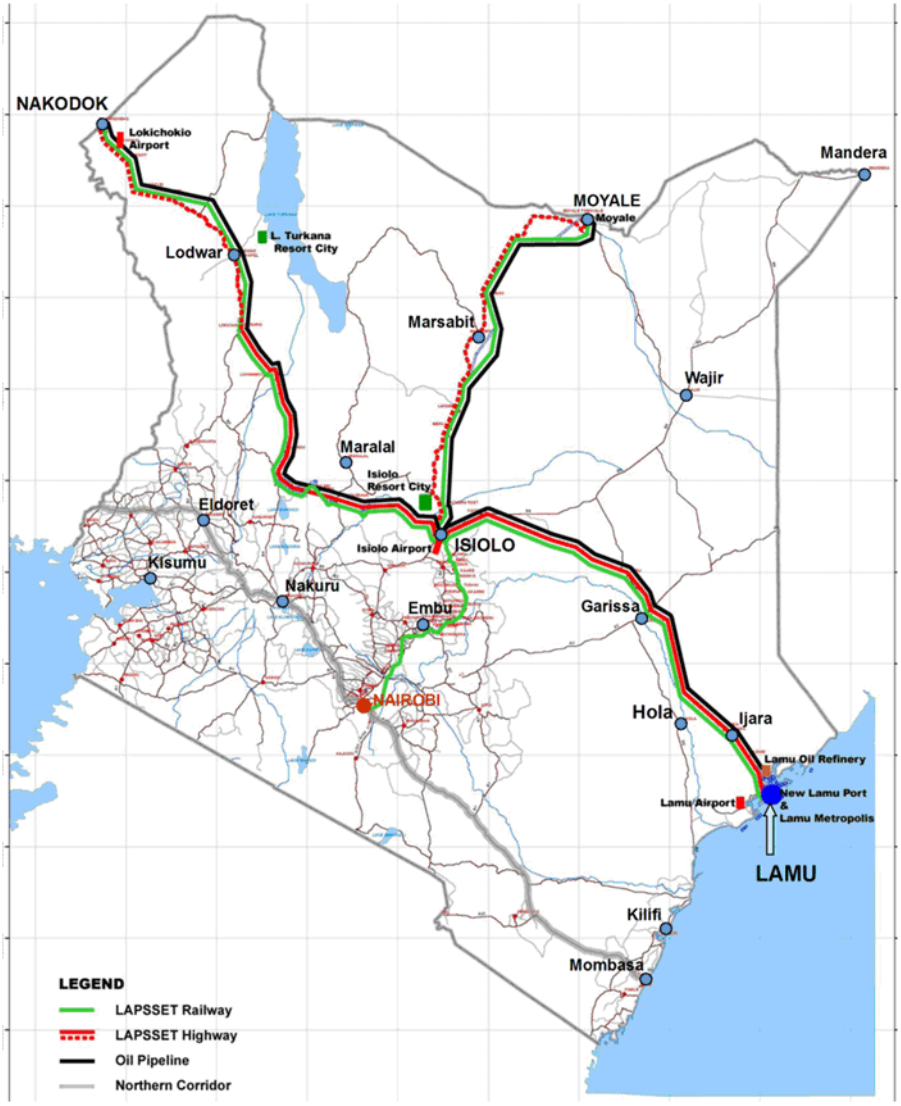

Figure 4.2 LAPSSET Corridor Project in Kenya.

Source: Kasuku, 2012, Page 8.

The Lamu Port project consists of the construction of the following components: channel and basin dredging, access road, port craft repair facility, port management zone, container handling equipment, water and electricity supply, and Siyu Channel to be developed for small boats to navigate through during low tide (Kenya Ministry of Transport 2013). In April 2013, a Chinese company won the bid out of 17 international

companies to build the first three berths. By November 2013, the only completed construction was an office building for the Kenya Port Authority staff to guide future work, and the dredging had not been started.

Figure 4.3 LAPSSET Corridor Project and the Great Equatorial Land Bridge.

Source: Njiru, 2011, Page 6.

In August 2014, a contract worth USD 480 million was finally signed between the Kenya Ports Authority and the China Communication Construction Company (CCCC) for the first three berths (Capital News 2014). The Chinese company started the construction since April 2016, and aims to complete the first three berths in 2018. Based on the past experience of Chinese ODF in Africa, the Chinese ODF in Lamu Port should be regarded as concessional loan. However, the details on how Chinese ODF would be involved in this project, including the interest rate and the grace period, remain undisclosed, as with many other projects.

4.1.3 Possible environmental and social risks

In 2010, the Japan Port Consultants of Tokyo and another company carried out a *Feasibility Study of the entire LAPSSET Corridor Project* at the request of the Kenyan Government. The study set out to undertake a full technical, economic and financial feasibility study on the development of the proposed Port of Lamu and all the other LAPSSET Corridor components, and to prepare detailed designs of the first three berths of Lamu Port and other associated infrastructure, including road, railway transport, storage area of bulk/break bulk cargo and containers with and without shelter, administrative offices, mechanical repair shop, parking

and welfare facilities for employee of terminal operators, drivers of the on-land transport trailers, freight forwarders, customs brokers, and so on (Japan Port Consultants & BAC/GKA JV Co. 2011).

In the section on the development plan for Lamu Port, the final report listed the potential impacts/risks to environment and communities in Lamu, in terms mainly of eight aspects: water quality, mangrove forests, fisheries, historical and cultural sites, land ownership, terrestrial and marine wildlife and others. The detailed eight ESRs analyzed in the final report may be summarized as follows:

1. **Water quality.** At risk from port development activities such as excavation and dredging, which cause dispersal and settlement of re-suspended sediments (turbidity). Related impacts include effects on coral reefs and mangrove plantations.
2. **Mangrove forest.** At risk from direct human impacts, including forest clearance for long-term port development, and an influx of population in the region, increasing the risk of mangroves being felled for commercial and personal use.
3. **Fisheries.** At risk from port development, affecting the accessibility to fishing grounds and fish stocks by local fishermen. Even though the area where the port is proposed to be constructed is not a major fish spawning ground, water quality will be affected, which then may cumulatively reduce fish stock in the area. Thermal pollution may happen as well since the port plan includes the construction of a power plant on one island. The location of the discharge of the cooling water needs to be controlled to make sure that temperature in the surrounding sea is not elevated to damaging temperatures for the fish larvae.
4. **Archaeological, historical and cultural sites**. At risk from the port construction and existence of the proposed port and hinterland, and an influx of migrant workers from other districts in search for employment and business opportunities, resulting in a "dilution" of the local culture. Lamu is the oldest with over 700 years of history and best-preserved living settlement among the Swahili towns along the East African coast. Since the 19th century Lamu has been regarded as an important religious center in East Africa. Every year, thousands of pilgrims from the region flock to Lamu town for the famous Maulidi, celebrations that are held during the third month of the Muslim calendar to mark the birth of the Prophet Mohammed.
5. **Land ownership**. At risk from securing the land for the proposed port by the proponent. The land in Lamu is either government land or private land. The proponent will need to acquire land. Land ownership in Lamu is a highly sensitive issue and should be implemented with caution by the Ministry of Lands in collaboration with the local authority and the proponent.
6. **Terrestrial and marine wildlife**. At risk from port construction, affecting the National Reserves (Dodori/Boni and Kiunga) and UNESCO Biosphere (Kiunga) in the area. Although the proposed port is not within any of their boundaries, migratory animals need to be considered, most notably elephants, lions, dugongs and sea turtles. Evidence shows that large mammals cross the tidal flat to the west of the proposed site. Five out of the seven species of sea turtles feed/nest in Lamu waters. All five species are categorized as endangered or critically endangered on the International Union for Conservation of Nature (IUCN) Red list. The port construction might also increase the wildlife-human conflicts as the population in the area increases, and the migration routes for some wildlife may be interfered with as well.
7. **Transportation of cargo, especially oil.** At risk from the possible accidents occurring offshore at the

proposed oil refinery in Lamu, causing damage to critical marine habitats like the coral reefs, sea turtle nesting grounds and mangrove.

8. **Other induced risks**. With the high influx of migrant workers in the area, there will be an increased risk of HIV/AIDS and Sexually Transmissible Infections (STI) in the area. It has been predicted by the 2010 feasibility study that the population in Lamu will increase to over 1.25 million people over the period of construction, over ten times of the current population of Lamu Country (as of 2012, 112,251 in total). According to the Kenyan Government, Coast Province, where Lamu is located, has a HIV/AIDS prevalence rate of 8.1%. However, the National AIDS and STIs Control Programme estimate the prevalence rate in Lamu at 3.2%. The challenge will be to keep this relatively low prevalence rate with the increase in population.

The study also called for a number of measures to identify and manage the ESR, such as detailed Environmental and Social Impact Assessments (ESIA), to be carried out at each phase of the port project, as well as Archaeological Impact Assessments (AIA) and Land Acquisition Studies (Japan Port Consultants & BAC/GKA JV Co. 2011).

As pointed out in the final report, ESIA is both a planning and decision-making tool. As a planning tool, ESIA presents methodologies and techniques for identifying, predicting and evaluating potential environmental impacts of projects, policies, plans and programs in the project cycle (planning, implementation and decommissioning phases). The ESIA process also presents decision-makers with the information necessary to determine whether or not a project should be implemented.

However, in 2012, the Kenyan Government launched the Lamu Port project without conducting an ESIA. In February 2013, the Kenyan Government finally submitted a final ESIA report for the Lamu port three berths, as it is required in the Kenyan Environmental Impact Assessment and Audit Regulations (2003).

The final ESIA report by Kenyan Government claims to provide for sufficient investigation and participation of a wider section of stakeholders so as to determine mitigation measure including the ESIA and AIA. In the end, the report proposes that the project be allowed to proceed if the mitigation measures proposed are implemented (Table 4.1), and as well as any further conditions that may be imposed by the government following consultation with other stakeholders.

The ESIA final report, in its Monitoring Components and Responsibility section, assigns the monitoring responsibilities, and suggests that out of all the possible impacts, for only two aspects – land acquisition and fisheries constraints – in the Designing phase, the monitoring responsibility goes to the proponent – here, the Kenyan Ministry of Transport (KMT), as well as the Ministry of Land (MOL) and Fisheries Department respectively (Table 4.1). While in the Construction Phase, it is the contractor who should take all the monitor

duties for the other nine components. Thus, the contractor of the first three berths of Lamu Port would be playing a critical role to mitigate the possible ESR in the ESIA report. Meanwhile, there was no public consultation with the Lamu local communities, as pointed out by Save the Lamu, a grassroots NGO in Lamu (Save the Lamu 2014). Save the Lamu concluded this after organizing discussions with many other local NGOs, and thus this represented their consensus views.

Table 4.1 Monitoring components and responsibilities
in the first three berths of Lamu Port and associated infrastructure

No.	Component	Responsibility	Monitoring Parameter
1	Water	C: Contractor O: Port Operator	Quality, quantity, reliability, accessibility
2	Soil		Erosion, quality, salinity, nutrient concentrations
3	Fauna		Abundance, habitat accessibility
4	Critical Ecosystems (Coral, Mangroves, nesting ground)		Abundance, presence/absence, regeneration size
5	Air		Quality
6	Noise & Vibration		Levels, frequency, times of exposure
7	Water Traffic		Congestion, accidents
8	HIV/AIDS & STI Prevalence	C: Contractor, local NGO or FBO	Awareness, prevalence, cases, condom access
9	Effluent	O: Port Operator	Quality
10	Land Acquisition	C: Proponent, MOL D: Proponent, MOL	Completion of compensation of resettlement, livelihood restoration
11	Fisheries Constraints	D: Proponent, Fisheries Dept	Completion of compensation of resettlement, livelihood restoration

Note: D: Design Phase; C: Construction Phase; O: Operation Phase. Proponent is Kenyan Ministry of Transport; MOL is Ministry of Land; FBO is Faith-Based Organization; Operator is the future operation organization, unknown yet.
Source: Author compilation based on Kenya Ministry of Transport (2013).

4.1.4 Institutions on mitigating the environmental and social risks

Since the mid-1990s, DAC members have been exchanging information on their policies, practices and experiences on addressing environmental and social risks. As a result, a DAC Recommendation was established. Although legally non-binding for the member countries, the recommendation registers the willingness of the DAC countries to take the environmental and social risks of development into account when providing official development finance. Many DAC member countries including the US, the UK, France and Japan, currently require consideration of ESR in planning for all official development projects.

For instance, France Development Agency (AFD), a financial institution and the implementing agency for France's official development assistance, requires that AFD qualifies and assesses its ESRs during the project appraisal phase and evaluates their levels. Environmentally speaking, projects can have risks in terms of ecology (adverse effect on natural environments and biodiversity), pollution (water, air, soil) and nuisances (noise, waste) and natural, technological and health risks (AFD 2014b). They could also have an impact on the communities, natural resources (water resources, soil and underground resources, land resources), on the living conditions of communities, and on the natural, historical and/or cultural heritage. The social risks also concern aspects relating to fundamental human rights, such as population displacement, working conditions and equity for disadvantaged or excluded social groups, particularly women and ethnic minority groups (AFD 2014b).

The reason for DAC countries' prioritizing the ESR issue is not only that the environment and local communities might face adverse impacts, but also that the financial institutions and the investing companies might be exposed to some risks as well. A financial institution's transaction with a client or investee can represent a financial, legal and/or reputational risk to the financial institution because environmental and social issues are inherent in client/investee operations (IFC 2014). The foreign investment companies might have risks arising from ESR in both host and home countries, with the most severe one that host governments can withdraw permits and licenses, or impose civil or criminal penalties (WRI 2013).

As for Chinese institutions addressing the ODF's ESR issues, the Chinese government has issued a series of guidelines and regulations for guiding the Chinese companies overseas (Appendix 1). These policies revealed that Chinese government has realized the importance of better controlling ESR of Chinese investment overseas. However, the majority of these directives are guidelines, with none legally binding.

As for the ESR related policies by the Kenyan government, Kenya's current environmental regulatory regime originates from the Environmental Management and Co-ordination Act (EMCA) in 1999. The National Environmental Management Authority (NEMA) was established to enforce EMCA's provisions and the associated legislation, governing water quality, waste management, controlled substances, biodiversity, wetland, river and seashore, and environmental impact assessment (EIA) (Barczewski 2013).

NEMA's main task is to review and grant licenses to those applying for changes in current land-use. NEMA has an average annual budget of about KSH 560 million (about USD 6.6 million), with much of it from the licensing fees, while the remainder is from the Kenyan government (Barczewski 2013).

The Kenyan government is responsible for resettlement and compensation of these communities. The

party implementing the project is in charge of monitoring the ESR mitigation activities conducted by the construction companies. And EMCA requires that during the EIA the project authority shall seek views of persons affected through posters, newspaper, radio and hold at least three public meetings (NEMA 2003).

It is pointed out that the relationship between the lead expert conducting the EIA study and the project authority can be a very weak point (Barczewski 2013). As stated by EIA regulations, the project authority has to employ a NEMA-licensed lead expert to conduct EIA study on behalf of the proponent. However, the lead experts tend to downplay the ESRs in EIA reports so as to quickly get the full payment from the authority (Barczewski 2013).

4.1.5 Research question and hypothesis

In considering China's critical role in financing Kenya's transportation transition and its lack of mandatory mechanisms for mitigating the environmental and social risks, in this chapter we aim to explore the answer to the research question: how can Chinese actors through their transportation projects motivate the Kenyan infra-system regimes towards the sustainability transition?

The hypothesis is that Chinese donor motivates or hinders the Kenyan infra-system regimes by changing its single role quantitatively or qualitatively and role constellation. If the role is changing towards sustainable transition, either by itself or through role constellation, it motivates the transition. If without the sustainability perspective, it hinders the transition. Therefore, we will examine whether Chinese actors have changed their roles concerning the ESR mitigation in the Lamu Port project, either quantitatively or qualitatively. Meanwhile, we also review other actors closely related to the ESRs in this project, and their role constellation with Chinese actors so as to reveal the hurdles for the sustainability transition.

4.2 Methodology

4.2.1 Actor identification

It is important to identify the actors involved into the Lamu Port project, which include the people or groups that are directly or indirectly affected, either positively or negatively, and those who have an effect on an effort, or who are important within or to an organization, agency, or institution engaged in an effort, such as governmental official, media, NGO, and researcher (University of Kansas 2014).

The multi-actors on the Chinese ODF in Kenya have been briefly introduced in Chapter 2, as also shown in Figure 4.4 – the local communities, the Kenyan Government, Chinese Government, Chinese

companies, Chinese banks, the media (including key Chinese media representatives in Kenya), the NGOs, and researchers on China-Africa issues. The list of actors needs to include those at the local, regional, national and international levels (Iizuka 2010). Thus, the government can be broken down as central government, ministries, and local government/embassy.

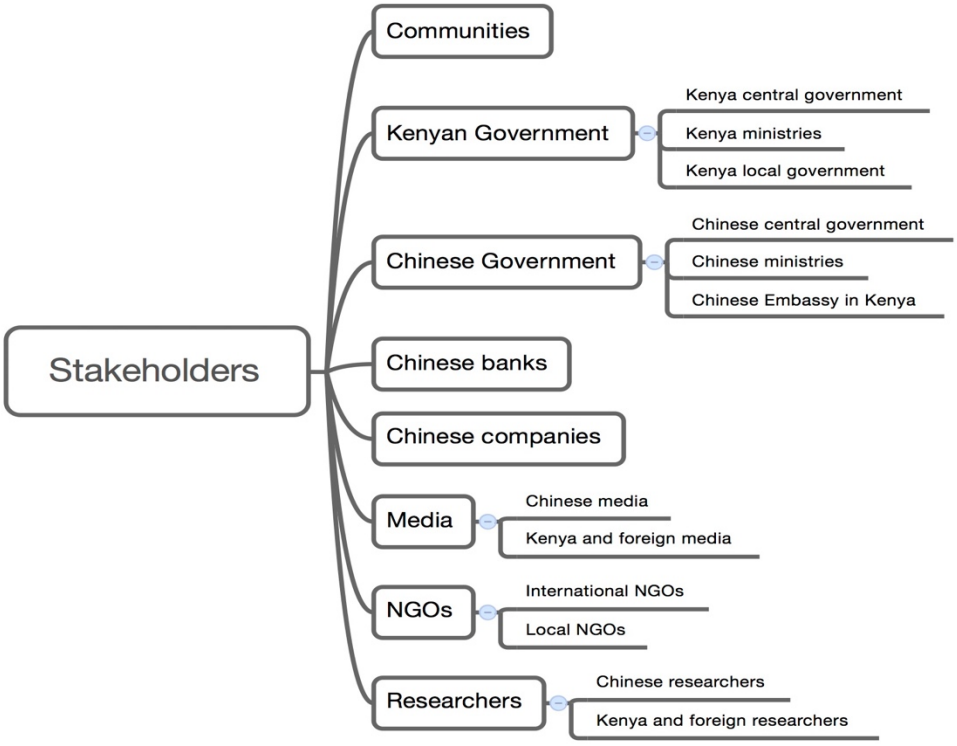

Figure 4.4 Various stakeholders of Chinese ODF in Kenya.

Source: Author

Most actors can be easily narrowed down, except for the communities. Given that the ESRs are located in the local communities, it is crucial to select the representative communities. The ESIA report of the Lamu Port project by the Kenyan Government included a socio-economic study to establish baseline data towards monitoring project impacts. And it was carried out in the areas most likely to be affected by Phase I of the project within the green semi-circle in Figure 4.5 representing the limits of the Lamu Port. Yet, the report failed to release details on the study locations.

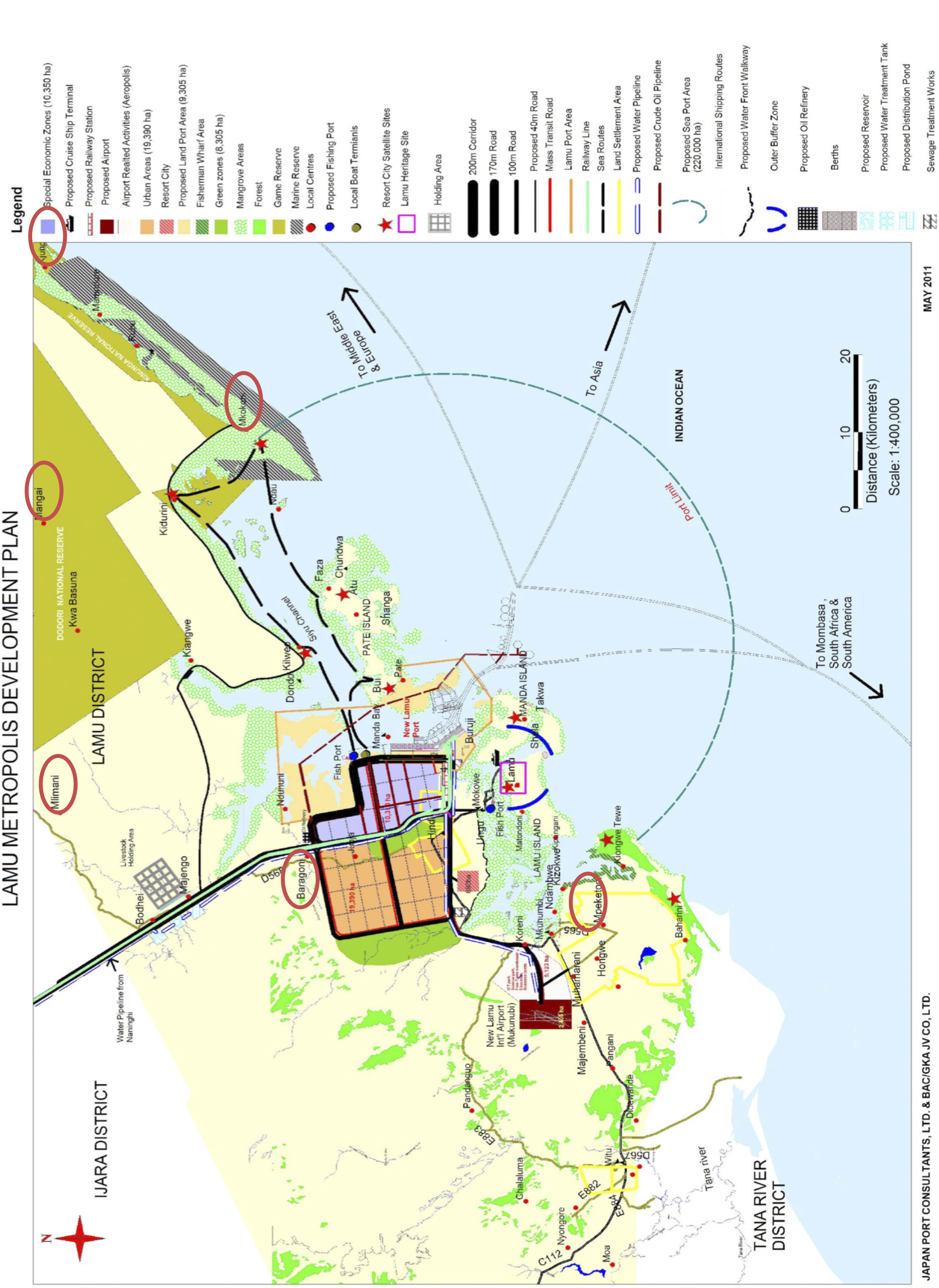

Figure 4.5 Lamu Port and its limit.

Note: Six red circles are added by author. Source: Kasuku, 2012, Page 12.

The ESIA report was sponsored by the Kenyan Ministry of Transport and contracted to a consulting company Heztech Engineering Services. The primary data was said to be collected from 150 respondents, from the Lamu Port Steering Committee, local community, Government agencies, NGOs and Community-based Organizations (CBO). A conclusion was drawn that in general the port project is acceptable to the Lamu community, with 89 percent respondents commenting that the port will benefit the local community, and only 1 percent expressing that it will result into an abrupt relocation that might lead to the losses of un-harvested farm productions, land and sources of livelihood.

To better understand the role of the local community actors towards the Lamu Port, six locations were selected for survey: one town (Mpeketoni, the lowest red circle marked in Figure 4.5, which is the main Christian region in Lamu County and the site of the recent terrorist attack by Somali Al-Shabab) and five villages (Mkokoni, Kiunga, Mangai, Milimani, Bargoni, the other five red circles marked in Figure 4.5 in the next page), which are further away from Lamu Island, but still near the Port area and cover the Kiunga Marine National Reserve and the Dodori Forest National Reserve.

4.2.2 Questionnaire

Questionnaire purpose

The purpose is two-fold: firstly, to understand the traditional way of using natural resources by the local indigenous communities, so as to learn their connection with the marine and forest which it to be affected by the Lamu Port construction; and secondly, to understand their perception or concerns on the potential environmental and social risks of the port construction, in order to better understand the role changes.

Questionnaire implementation

The questionnaire was conducted from September to December of 2013, during an internship as part of the master's program of the Graduate School of Global Environmental Studies, Kyoto University. My affiliation institute was World Wide Fund For Nature (WWF) Africa and Madagascar Programme Office in Nairobi.

With support from WWF Kenya Country Office and Kenyan Wildlife Service, I was able to obtain a research permit (No. NACOSTI/RCD/17/013/48) from the Kenyan National Commission for Science, Technology and Innovation. I carried out a two-week field study in Lamu from 15-27 November 2013, including administering a questionnaire to community actors.

Although 67.3 percent of the population in Lamu County can both read and write (Lamu County

Government 2013), the literacy rate is much lower in rural area including the six field study locations. This made the use of a written questionnaire difficult. Thus, I chose to ask the actors the questions orally, and recorded their audio answers. I next transcribed them in full, ready for analysis.

As for the language, few people in the six study locations speak English. Swahili was the most commonly used language for the oral questionnaire with the help of the interpreters, and the Somali language was also used in some cases. In the case of Somali language, two interpreters are necessary– firstly translating the questions from English to Swahili by the first interpreter, and then from Swahili to Somali by the second interpreter; the answers following the reverse way.

Each oral questionnaire session took about 10-50 minutes, depending on the questionnaire respondents' time and personality, as well as the translation complexity. Staff at the WWF Lamu Local Office assisted me in the selection of respondents and carrying out the survey. After introductions by WWF colleagues and the Sub-Chief, I was able to access the houses of the interviewees to conduct the study.

Questionnaire respondents

In the two-week field study, 35 community members answered the questionnaire survey. While selecting the respondents, various aspects such as the location, tribe and way of making a living were taken into consideration to understand the environmental and social impacts of the port construction (Appendix 2).

The study in six town/villages covered seven different groups: Farmer, Forest Dweller, Fisherman/woman, Pastoralist, Businessman/woman, Women and Village leaders, in term of their ways of making a living. I interviewed five to eight people for each group. One person can belong to two or more groups. For instance, a fisherman/woman might also be forest dweller or farmer. He/she is counted as fisherman/woman in the main group, because he/she claimed himself/herself mainly to be fisherman/woman.

The women and village leaders were selected to reflect their possible different point of views. An UNDP report states that rural women in developing countries are more vulnerable to climate change, since they are the primary producers of staple food, a sector that is highly exposed to the risks that come with drought and uncertain rainfall (UNDP 2008). The chiefs and assistant chiefs (sub-chiefs) are important in the administration of local governments in Kenya.

Most of the 3 percent who are Christians in Lamu Country live in Mpeketoni Town (where the terrorist attack later occurred). I was able to include four respondents from Mpeketoni on the occasion when they came to Lamu Island to join a meeting organized by WWF Lamu Local Office. All four Mpeketoni

respondents are from the Kikuyu Tribe, the largest tribe in Kenya and equal to about 23persent of total population by the Kenyan population census in 2012.

The remaining 31 respondents were questioned individually at/near their homes in the five villages. All the remaining respondents are Muslim. And they belong to two of the four main indigenous ethnic groups: the Bajuni and Boni, as well as other ethnic groups including the Somali, and the Kikuyu. The road situation and short time made it impossible to cover the other two main communities: Orma and Sanye. For the respondents from the two villages of Mkokoni and Kiunga, they are mostly from Bajuni Tribe; for the respondents from the three villages of Mangai, Milimani, and Bargoni, they are mostly from Boni Tribe. There are also four respondents from the Somali Tribe.

Questionnaire content

My questionnaire questions included open-ended questions, and closed questions with multiple choice answers for the respondents to choose from. Each respondent was first asked the open-ended questions to start the interview in a rather relaxing atmosphere, followed by the closed questions.

Open-ended questions, as shown in Appendix 3, were designed respectively for the seven different groups from the perspectives of their occupational history, alternative livelihoods, and basic attitudes to the port construction, so as to explore whether the port will affect their livelihood, and in which way. Take the fisherman for example, the questions include the history of fishing in his/her family, the changes in the past decade, where/how/how often does he/she go fishing, how much is sold or consumed at home, other alternative livelihoods, the perception on whether the port construction will affect his/her livelihood.

The 15 closed multiple choice questions are for all the respondents (Appendix 4). The questions include their perceptions about the positive and negative impacts those might be induced by the Lamu Port construction, for instance, the impacts on their environment, land, livelihood, health situation, and culture.

4.2.3 Semi-structured interview

For the interviews with various non-community stakeholders, I applied semi-structured interviews, an interview method that is used when more useful information can be obtained from focused yet conversational two-way communication with the interviewees. In a structured interview, it is usual to formulate detailed questions before the interview. In contrast, semi-structured interviews start with broad and more general questions or topics (Arksey & Knight 1999).

Interview purpose

The purpose of the interviews is two-fold: firstly, to understand the perception of each actor on their roles with regard to mitigating the ESR of Chinese ODF; secondly, to check their relations and whether there is some coordination among them, if yes, whether it is sufficient; if not, what might be done, involving the suggestions/lessons from the African researchers and Japan International Cooperation Agency (JICA).

Interview implementation

While in Kenya from September to December of 2013, I interviewed the representatives of other stakeholders besides the communities, including Kenyan Government agencies, Chinese Government agencies (namely, the Chinese Embassy in Kenya), Chinese companies in Kenya, and the main Chinese state-owned media in Kenya. Interviews with other organizations were also arranged, such as the Kenyan Office of Japan International Cooperation Agency (JICA). Meanwhile the interviews with the Lamu County Government and the local NGO were conducted on the Lamu Island during my field study in November.

Besides the interviews in Kenya, other interviews with WWF China Office and a large range of African researchers were carried out respectively in April of 2014 in Beijing, and in May of 2014 in Moscow.

The individual interviews with the Kenyan Government agencies took place while taking part in the meetings/workshops organized by WWF in Nairobi. The interviews with the Chinese Government agencies were held in Nairobi while a Chinese Government delegation was there for a Forum on "Ecological Civilization and Green Transformation" co-organized by China Council for International Cooperation on Environment and Development (CCICED) and United Nations Environment Programme (UNEP). And a separate meeting with the Chinese Embassy in Nairobi was arranged in the name of WWF. Minutes of the meetings were taken for all the interviews with the government stakeholders.

The interviews with representatives of the Chinese companies were conducted by telephone, email, or in face-to-face individual meetings in November 2013, before and after the field study in Lamu. Interviews with the key Chinese state-owned media were also conducted face-to-face in November 2013. Since the Lamu Port had not started construction by 2013, a follow up remote interview with the Chinese company was done remotely in November 2017. These interviews were not recorded, at the request of these interviewees. I use general comment from them to show their opinions anonymously.

The interviews with the local and international NGOs working closely on the Lamu Port and Chinese

ODF in Kenya were recorded upon my visit to their offices, as well as the interview with JICA representatives in Kenya. The interviews with the African researchers were possible while participating in the13th International Conference of Africanists "Society and Politics in Africa: Traditional, Transitional, and New" held by the Russian Academy of Sciences in Moscow. Their opinions on mitigating the ESR of Chinese ODF in Kenya were delivered in the discussions after my presentation on this topic in two panels.

Interviewees

Information on the stakeholders who were involved in the interviews, including the number of representatives from the organization, the organization, the date and the period during the internship period or follow-up can be seen in Appendix 5. Additional attempts were made by telephone or email to contact other Kenyan government officials, four other Chinese companies and three key Chinese banks but they failed to secure interviews.

Interview content

While preparing for semi-structured interview, only topics and sub-topics are identified rather than specific questions. It is hoped that specific questions would emerge as a matter of course during the exploration of these topics and sub-topics. This can give the interviewer more freedom to explore issues as a matter of course rather than pre-empting the issues (Arksey & Knight 1999).

All the semi-structured interviews in my research center on three topics: respondents' perceptions on their role concerning the environmental and social risks of Chinese ODF in Kenya/Africa, perceptions on who should take the mitigation responsibility, and role constellation with other actors.

4.3 Actors and their roles changes

This section presents the results on the role changes of actors from both Kenyan and Chinese aspects concerning the ESR of the Lamu Port project.

4.3.1 Kenyan actors' role changes

The results from community survey and interviews mainly reveal the role changes of community actors. The environmental changes due to the port result in the changes of community livelihoods. In the response to the potential ESRs, Kenyan central and local government had not provided timely mitigation measures,

particularly for the land issues.

The results (Appendix 6 and 7) revealed that although seven different groups rely differently on the natural resources, they all depend highly on the natural environment in their livelihoods for food, water, building materials, fuel wood, medicine and family income.

All 35 respondents mentioned that their livelihoods are being affected because of environmental changes in the past decades. Table 4.2 presents the environmental changes, the natural and man-made reasons for these changes, and their effects on the respondents' livelihoods. The numbers in the brackets indicate how many of respondents from the group or all 35 respondents mentioned this point.

Table 4.2 Environmental changes and their effects on livelihoods for the seven groups

Group	Environmental changes	Reasons	Effects on livelihoods
Fisherman/woman (8)	Less fish (8/8)	Natural: El Nino phenomenon (3/35) Climate change (4/35) Man-made: Forest logging (8/35) Increasing population (4/35)	Less food and less income (5/8)
Forest Dweller (5)	Less honey, less mangrove, and more wildlife (5/5)		Less food, less income, and more human-wildlife conflicts (2/5)
Pastoralist (5)	Degraded grassland, and more animal diseases (3/5)		Farther grazing site and loss of animals (2/5)
Farmer (7)	Less rainfall, and more wildlife (5/7)		More work but less harvest, and more human-wildlife conflicts (5/7)
Businessman/woman (6)	Less rainfall, less fish (5/6)		Less income (5/6)
Woman (8)	Less fish, less rainfall, more wildlife (6/8)		More work but less harvest (2/8)
Village leader (4)	Less rain, less forest, less fish, less elephant and rhino, more other wildlife, less honey (4/4)		More work (2/4)

Source: Author

The questionnaire study indicates a high concern on the possible ESRs of the Lamu Port construction. Sixty-four percent of respondents think the construction will affect the environment near their families, with 25 percent thinking the construction will not affect the environment near their family, and 11 percent not knowing whether it will affect the environment or not. About 65.2 percent think the changes in the environment because of the Lamu Port construction will affect their livelihoods a lot, and 26.1 percent think it will change completely, 4.3 percent think it will change a little and only 4.3 percent think no effect.

The further explanation from the forest dweller respondents shows that the loss of mangroves will not only reduce the amount of mangrove logging, but will also affect the current local customs of using mangroves as the building materials, as well as for other daily usage. Already, the current mangrove collection has been facing decline due to both natural and man-made factors: “the reason for the decline is the growing population, and more construction”, as No.11 mangrove collector said.

Ninety-one percent of the questionnaire respondents are worried about the potential increasing STI diseases because of increasing workers from outside of Lamu in the process of construction. Some respondents show concern that the women will follow new fashions, like shorter skirts above the knees. And there are also concerns related to religion, as No.4 mentioned, “our religion will be destroyed, because we are going to have more bars here.”

Sixty-nine percent of the 35 respondents think the construction will affect their land and they are afraid of forced resettlement. Out of the 68 percent respondents, 42 percent want to give up their lands and move their families only if the compensation is agreeable; and 58 percent said they would not want to move even if the compensation is enough.

As for the Resettlement Action Plan, a necessary process while resettling the residents in the development of the project, the study indicates that by November 2013 the Kenya Government hadn’t carried out any measures. One respondent from Bargoni Village stated that land grabbing is happening seriously. One local land dealer in the same village, one respondent as well, claimed that in the past year (2012-2013), more than 100 buyers had bought land in Bargoni Village. He explained that the buyers only buy the farmland because they assume the government will only compensate those with farmland and they will leave the land once it has been bought. Because the local people don't have Title Deeds, they don't have any documents to prove land tenure.

The elders from the Boni community organized a meeting to protect their community land rights because they think almost 80 percent of the port activities in Lamu are on Boni land. As a result, 159 attendees signed the petition letter, to the chairman of the Land Board, and other government offices in August 2012. But as of November 2013, there has been no reply. Their activity gained support from a local NGO named Save Lamu, which has been sending letters to the Office of the Prime Minister requesting that he investigate and address land tenure violations against the indigenous Lamu communities before any further development plans are inaugurated. News released in October 2016 said that “the state is expected to shell out billions” for land compensations (Daily Nation 2016).

Nonetheless, 71 percent of the respondents think the project will bring in more tourists, and thus they can earn more money from tourism, especially for the businessman/woman group and woman group who makes handicrafts for informal selling. Ninety-one percent of the respondents think the construction of Lamu Port and its associated infrastructures will offer them an improved road and transportation network. Seventy-seven percent consider more job opportunities will be provided. Sixty-three regard modern and convenient life to also be one of the possible good impacts.

For the local communities, they are aware of the ESRs to be induced by the project, such as the land issue, and they believe that the Kenya government can do many things for them, such as providing trainings to prepare for future jobs.

However, the Kenyan government is inactive in this role, as was evident in the absence of feedback to the petition letter from the Boni community to protect their land rights, and the failure to organize training sessions for the community, after the explanation by local governmental officials. The Lamu local government, in an internal publication *Lamu County Development Profile Towards Kenya Vision 2030*, regards the Lamu Port Project as providing a boost to local development and the economy, and doesn't mention about the importance of mitigating the potential negative impacts it might induce (Lamu County Government 2013).

Meanwhile, beyond fighting for land rights by sending letters to the government, the local communities also took other measures. Some grassroots activities have been organized by NGOs to raise their awareness and increase the capacity of protecting their rights, besides the mentioned activities by Save Lamu. Save Lamu organized some workshops to engage the local communities, however, during the semi-structured interviews, the staff said they could not cover some communities due to lack of funding and capacity.

4.3.2 Chinese and other actors' role changes

Based on the results of questionnaire and interviews, in tandem with literature review, Table 4.3 summarizes the perceptions of various actors on who should take the mitigation responsibilities, and their own roles.

The Kenya government states in the ESIA report that the project proponent – the Kenyan Ministry of Transport (KMT), as well as the Ministry of Land (MOL) and Fisheries Department respectively – should take charge of land acquisition and fishery issues, and the contractor – the Chinese company – should carry out all other mitigation measures.

Table 4.3 Perceptions of various actors

Stakeholders	Perceptions of who is responsible for mitigation	Perceptions of self-role
Local communities	Kenya government	/
Kenya government	Chinese companies	Contractee
Chinese government	Chinese companies	Support Chinese companies
Chinese companies	Chinese companies	Contractor
Chinese media	/	Report Chinese companies
NGOs	Chinese and Kenya governments	Dialogue platform
African researchers	Kenya government	Think tank

Source: Author

The interviews in 2013 and 2017 revealed an improvement of the Chinese companies in understanding and mitigating the ESRs induced in their contracted projects in Kenya. The Chinese companies in 2013 regarded themselves merely as contractors, indicating they mainly focus on the project construction, and the ESR mitigation is a rather blurred concept, always mixed up with Corporate Social Responsibilities (CSR) such as donation of a school or clinic.

A follow-up interview in November 2017 suggested that the China Road and Bridge Company (CRBC) has conducted several concrete measures in the construction to protect the local environment and provide job opportunities to the local community. Cross-checking with the required ESR mitigation responsibilities by the ESIA report and the measures conducted by the Chinese company (Table 4.4), demonstrates that CRBC has fully considered almost all of the required environmental impacts, including on water, soil, fauna, mangroves, air, noise, and water traffic, and excluding water traffic aspects.

Additionally, CRBC has hired a National Environmental Management Authority (NEMA) registered expert to evaluate on site regularly to ensure the construction is not causing negative environmental influences. As for the social aspects, CRBC has built lodges, canteen and clinic for the local workers, and set the principle of local employment and procurement which further boost the growth of local economy. The ratio of Chinese and Kenyan workers is one to eight persons.

Table 4.4 Cross-check the required responsibilities and conducted measures by Chinese company for the first three berths of Lamu Port

No.	Component	Responsibility	Monitoring Parameter	Measures by Chinese company
1	Water	**C: Contractor** O: Port Operator	Quality, quantity, reliability, accessibility	Invite KBS to test and monitor the sample water on site monthly; Construct sandbag walls and silt curtain in the dredging.
2	Soil		Erosion, quality, salinity, nutrient concentrations	Collect the solid waste and waste oil, and recycle by qualified disposal companies
3	Fauna		Abundance, habitat accessibility	Remain the sensitive habitats intact when building camps; Hire NEMA registered expert to evaluate on-site regularly
4	Critical Ecosystems (Coral, Mangroves)		Abundance, presence/absence, regeneration size	Build the setting-back levees to reduce damage; Transplant affected mangroves with KFS in May-June 2018 (rain season), and restore the ecotope
5	Air		Quality	At the stone quarry in Jaribuni, use fog gun, sprinkler, and dust cover to dedust
6	Noise & Vibration		Levels, frequency, times of exposure	Monitor the noise daily
7	Water Traffic		Congestion, accidents	Not mentioned in the interview
8	HIV & STI Prevalence	**C: Contractor**, local NGO/FBO	Awareness, prevalence, cases, condom access	Provide local workers the lodge, canteen, and clinic.
9	Effluent	O: Port Operator	Quality	NA
10	Land Acquisition	C&D: Proponent, MOL	Compensation of resettlement, livelihood restoration	NA
11	Fisheries Constraints	D: Proponent, Fisheries Dep.		NA
12	Local employment	From April 2016 until November 2017, over 1,200 local workers have been employed. In November 2017, over 700 are local workers, with 57% from 20-30 years old, 28% from 31-40, 12% from 41-50, and 3% over 50. The ratio of Chinese and Kenyan workers is 1:8. Working with KPA and KMA, hired over 30 sailors and machinists from Bandari College.		
13	Local procurement	Procure the rebar, sand gravel, cement, and wood locally, providing indirect employment on production and transportation.		

Note: D: Design Phase; C: Construction Phase; O: Operation Phase. Proponent is Kenyan Ministry of Transport; KBS is Kenya Bureau of Standards; NEMA is National Environmental Management Authority; KFS is Kenya Forest Service; MOL is Ministry of Land; FBO is Faith-Based Organization; KPA is Kenya Ports Authority; KMA is Kenya Maritime Authority; Operator is unknown yet.

Source: Author compilation based on Kenya Ministry of Transport (2013) and interview with Chinese company.

Several factors may have contributed to the improvement of Chinese companies concerning their ESR understanding and practices within five years. The interviews with Chinese companies indicated that the

contractors, in order to complete the constructions within deadline, have to respond to all the potential issues. And they have gradually realized that ESR is one of these issues based on the lessons they gained from other projects in and out of Kenya. The Chinese embassy also organized some workshops to raise the awareness of protecting wildlife and environment in the daily life and work of these Chinese companies. The media may have also played a critical role in pushing forward the sustainable practice of Chinese companies. Furthermore, interviews with Chinese companies in Kenya also suggested that within the devolving government system since the new Constitution's establishment in 2010, they had to be more engaged with the local government officials who tend to pay much attention to the environmental and social impacts in their electoral regions, which may be less concerned by the central government officials.

The Chinese government has gradually formulated several guidelines concerning the environmental and social risks of overseas investment. The most recent one is the "Environmental Risk Management Initiative for China's Overseas Investment", which encourages Chinese financial institutions and companies to strengthen their environmental risk management in overseas investments, follow the principle of responsible investment, and to apply the sustainable development concept into the "Belt and Road Initiative".

The interview with a Chinese government official from the Ministry of Environmental Protection in 2013 suggested that Chinese government is undertaking investigations on the environmental problems related to the livelihoods in Africa by regions, for China to better understand the environmental reality in Africa, and then try to explore the environmental cooperation mechanism between China and Africa. And the Chinese Ministry of Environmental Protection is aware of the Lamu Port construction by the Chinese ODF in Kenya, and is carrying out studies on it, to explore what can be done with the Kenyan actors.

The Counsellor and Deputy Chief of Chinese Embassy in Kenya in the meeting said, "the Chinese government is very willing to take measures to deal with the environmental and social risks of Chinese engagement in Africa, and are trying to organize workshops for the Chinese companies in Kenya to better perform their corporate social responsibilities (CSR)".

In the semi-structured interviews with the Chinese media representatives, they did not show clearly their perceptions of ESRs and who should be in charge of mitigation. This can be understood in the way that they have a non-biased position in the reporting. A few Chinese media representatives' high level of willingness to report on the activities of Chinese companies met with cold rejections on their media requests. The Chinese companies and Chinese Embassy even refused the requests from non-Chinese media. African researchers, as think tank, could have impact to increase the awareness of the African country governments

on the ESRs, and promote the viewpoint that the African governments should take the dominant role of mitigating the risks.

4.4 Actors' relations

This section reveals the actors' relations from the Kenyan perspective and their relations with Chinese ones. The examination of current role constellation provides the foundation of exploring the hurdles for sustainable transition.

4.4.1 Kenyan actors' relations

The last section introduced the local communities' efforts to protect their land rights, and the lack of response from the Kenya government. Additionally, the answers to Question 6 and 13 reveal a lack of communication on the port development and effective ESR mitigation measures between the communities and the governments, both at central and local levels.

For instance, only 40 percent of the 35 respondents stated that they were notified by the local government organizations about the port construction plan. And these respondents first heard about the planned construction on the day on which the three presidents of three countries came to Lamu to officially launch the Lamu Port project in March 2012. A Sub-chief of Kiunga Village said the village leaders had four meetings that were supposed to be about the construction with the chief of Kiunga Village every month, and they invited the whole community to join, probably at the scale of 200-300 people. However, the interview result shows that not all the community members know clearly what is happening about this project, and there is even one Somalia elder woman living locally who had not heard about the Lamu Port at all.

Besides, there is also a lack of communication about potential jobs in the construction. Three respondents mentioned that in 2012 some governmental officials came to their villages to rank people's working abilities, and promised that they would be given first refusal on any jobs related to the port construction, and that a number of training sessions would be held for them in the future. Yet the interviewees said nothing had happened by November 2013, and they did not know what is going on.

Fishery issues are one of the mitigation responsibilities belong to the Kenyan government. However, with the first three berths started the construction in 2016, the Kenyan central government finally decided in October 2017 that more than 7,000 fishermen who were displaced by dredging at the Lamu Port would not get monetary compensation, and they would instead get fishing equipment to enable them to conduct fishing

on the deep seas. It remains to be observed on how and when the fishing equipment would be allocated to the local fisherman groups.

4.4.2 Multi-actors' relations

Local communities and Chinese companies

The community respondents said there were some Chinese companies doing some construction nearby, but the Chinese companies seldom communicate with the local communities. The respondents have two images concerning the Chinese companies: one is that the Chinese eat their dogs, said by two respondents who stated that they had to lock up their dogs when the Chinese companies are around; the other is that Chinese employees are prisoners from China, mentioned by one respondent as the reason why the Chinese do not communicate with the local communities.

Interviews with various stakeholders reveals that these two main images about the employees of Chinese companies are also held by some well-educated Kenyans, besides the local community members. Lack of communication between the Chinese companies and the local communities left room for rumors, which leads to misunderstanding. With several hundred local workers employed by the Chinese company in Lamu Port project, mutual understanding may help to erase these biased perceptions.

Chinese companies and Kenyan government

The interviewed representatives of the Chinese companies in Kenya mainly consider themselves as no more than contractors carrying out the construction as required by the contractee, which in this case is the Kenyan Government. They only carry out the activities asked by the Kenyan Government, and do not interfere in the design process. As a contractor, the Chinese companies take up the required ESR mitigation measures.

However, one representative from a Chinese company in Kenya explained in 2013 that the Kenyan Ministry of Environment performs an annual environmental impacts assessment to the Chinese companies, to issue an environmental certificate which allows future operation in Kenya. However, the same representative admitted that "since the project belongs to the Kenyan Government, the assessment by the Ministry of Environment is mostly a formality". The relation revealed in the interview conducted in 2017 is shifted in a way that Chinese company is proactively engaging with the Kenyan authorities to evaluate its ESR performance in the project process.

Chinese companies and media

The meetings with the key Chinese media representatives in Kenya indicated that the Chinese state-owned media has the intention to report on the CSR activities of the Chinese companies. And there has been some media coverage on the CSR activities of Chinese companies in Kenya (Lianxing 2011). However, some media representatives complained that the Chinese companies only invited them when the Chinese companies were going to launch some large-scale projects in Africa, and some Chinese state-owned companies in Kenya even refused interview requests from the Chinese state-owned media, not to mention interview requests from the foreign media.

Chinese companies and NGOs

Interviews with representatives from World Wide Fund For Nature (WWF) and Save Lamu showed that both the international and local NGOs are engaging with the governments, the Chinese companies, and the communities to try to mitigate the ESR of Chinese ODF in Kenya, and protect the rights of the local communities. For instance, WWF is trying to engage with both Chinese and African countries' governments towards a fully consideration of environment and social impacts in the China-Africa cooperation, by organizing dialogues among the governments, companies, and researchers. The local NGO also mentioned they lack labor and funding while engaging with the Kenyan Government and other stakeholders.

"The Chinese companies do not have the experience of engaging with NGOs, even inside China. International NGOs with a long history and rich experience of working with the communities in Africa can help promote dialogue between Chinese companies and local communities," said one WWF staff.

African researchers and African governments

Interviews with the African researchers from research institutions showed their strong willingness African national governments to take the lead in mitigating the ESRs in their territories instead of putting all the responsibilities on the Chinese government. A senior researcher from Africa Institute of South Africa commented that, "it's not the Chinese government or the Chinese companies who are to be blamed, since all the ESRs coming with the Chinese ODF are not unique, but common with all the other countries". She also stressed the importance of African countries taking a leading role in this regard.

4.5 Towards sustainability transition

This section analyzed the hurdles for Chinese ODF to promote the infra-system's sustainability transition in Kenya, with the case of Lamu Port project. Based on the actor's power and interest, as well as cost and benefit analysis, coordination feasibilities are explored to help promote the sustainability transition.

4.5.1 Hurdles

Actors involved in the Lamu Port project have their roles changed while facing potential environmental and social risks. The community actors face livelihood change or even loss, and have started to protect their livelihoods and rights including but not exclusively land rights, with the help of NGOs. The Kenyan government agencies only take responsibility for land and fishery issues, with both in a passive and delayed way. The Chinese companies has conducted several mitigation measures to protect the local environment and provide local employment. The Chinese government continues to establish non-mandatory guidelines to encourage Chinese financial institutions and companies to improve their environmental performance in overseas investment.

The situation seems to be improving, however, the current role interaction and constellation is rather limited. What is worse, two facts may undermine the local environment and damage the communities' rights: 1) the Chinese government directly signs for ODF projects with the Kenyan government, and in this process no monitor mechanism exists to safeguard the environment and local communities; 2) the Chinese company and Kenyan government maintain contractor and contractee relations. In case the Kenyan government has a strong political will to push forward one project, Chinese company may extend less efforts to mitigate the negative ESRs.

Traditional donor actors through their ODF agencies monitor the ESRs and ensure that the ESR mitigation measures are taken in their ODF projects. Though a particular Chinese aid management agency has been discussed in academia and among policy makers, it seems project level coordination may be more realistic and act as pilots for a larger-scale coordination among multi-actors concerning the ESRs.

4.5.2 Proposed coordination mechanism

To enhance relations and role constellation among various actors, it is helpful to use actor mapping as a way of determining who can have the most positive or negative influence and their different levels of interest in mitigating the ESRs of Chinese-funded projects in Kenya or Africa.

The Power/Interest grid can help decide how to engage actors – how to marshal the help of those that support, how to involve those who could be helpful, and how to convert those who may start out feeling least interest (University of Kansas 2014). For the low interest-high power actors, the objective is to move them into the high interest-high power actors, by meeting their needs and keeping them satisfied though engaging and consulting on interest area. Then these actors will become key players. For the low interest-low power actors, the objective is to move them into high interest-low power actors, by keeping them informed.

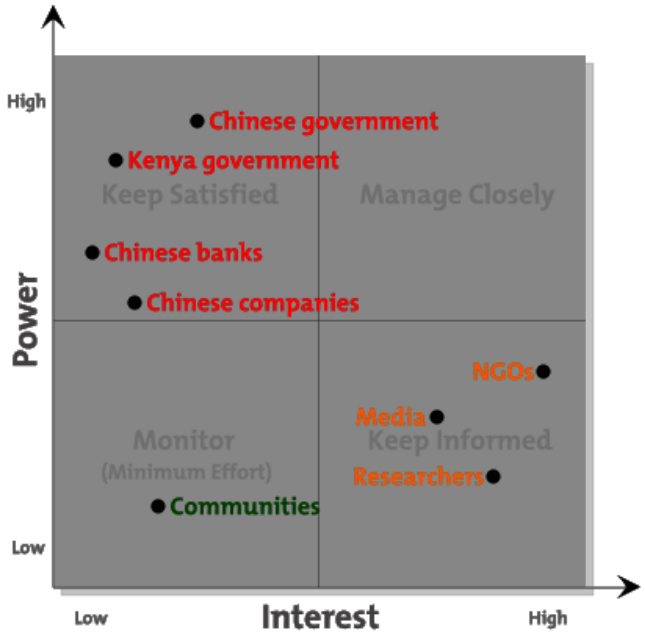

Figure 4.6 Power/Interest grid of various stakeholders on the mitigation of ESRs of Chinese ODF in Kenya
Source: Author, by using the Mind Tools

Figure 4.6 shows a Power/Interest grid of multi-actors on mitigating the ESRs of Chinese ODF in Kenya, based on the literature review and results of questionnaire and semi-structured interviews. The Chinese government, Kenya government, Chinese banks, Chinese companies, shown as red, can be regarded as high power yet low interest actors. The NGOs, media, and researchers, shown as orange, have high interest yet low power. The communities, shown as green, are low interest and low power actors. This is because although the communities have ESR concerns, the variety of concerns and interests held by different groups in the communities mean that the overall consensus interest is relatively low.

To engage with the various actors to mitigate the ESRs of Chinese ODF in Kenya, measures targeting the red stakeholders should focus on increasing their interest, to move them into the upper right quadrant as key players. For the communities, measures should focus on awareness-raising to keep them informed, thus moving them into the lower right quadrant.

Before introducing my proposed coordination mechanism, one earlier example of ESRs in a Chinese ODF-funded project may be instructive in regards to engaging multi-actors to mitigate the ESRs of Chinese ODF funded projects in Africa, which can be regarded as earlier attempts.

In the case of Ghana's Bui Dam Project, Sino Hydro had to implement the Construction Management Plan that was set by the Ghanaian Government and includes all the responsibilities of mitigating ESRs. Besides being supervised by Ghanaian Government agencies, Sino Hydro was also monitored by Coyne & Bellier, the French consulting company that conducted the project's feasibility study (Yuan et al. 2012). For the resettlement, International Water Management Institute (IWMI), a research institution, launched the Ghana Dams Dialogue Initiative to involve the various stakeholders so as to mitigate the ESRs to be induced by the dam construction, including a sixteen-member National Coordinating Committee, a sixty-member Ghana Dams Forum, and a secretariat that was hosted by IWMI and facilitated by the Volta Basin Development Foundation, an NGO (IWMI 2006).

The Bui Dam case shows the high interest and ability of NGOs in setting up the various actors' dialogue. Meanwhile it indicates the monitoring role of a consulting company. Since it is the consulting company that conducted the project feasibility study which included the environmental and social considerations and recommendations, the consulting company can act as a third party to monitor the project process.

The Ghana Dams Dialogue Initiative initiated by the NGOs successfully engaged the Ghanaian Government agencies, including the Ministry of Energy, and Ministry of Water Resources, Works and Housing, as well as the media such as Ghana Journalists Association. However, in its forums, the Chinese company and Chinese Embassy declined to participate, with the Chinese Embassy stating the reason that they did not think they are directly involved in the dam project (Yuan et al. 2012). Therefore, the interests from the Chinese stakeholders need to be increased and the measures are to be explored.

Further developed from the past practices, this paper proposes a coordination mechanism. The Ghana Dams Dialogue Initiative acted as a useful exploration and obtained some positive effects. However, considering the hugely increasing Chinese ODF across African continent, it might be more important to set up a long-term coordination system covering all the Chinese ODF funded projects, instead of one for each single project.

Given the diversity across the African continent, it is recommended to establish a coordination committee in each African country. The structure of the coordination committee is shown as Figure 4.7. For the coordination committee, equal permanent committee member seats should be arranged for the Chinese

and African governments. For the Chinese government, coordination will optimally be the responsibilities of some key Chinese ministries, either the Ministry of Foreign Affairs or the Ministry of Commerce.

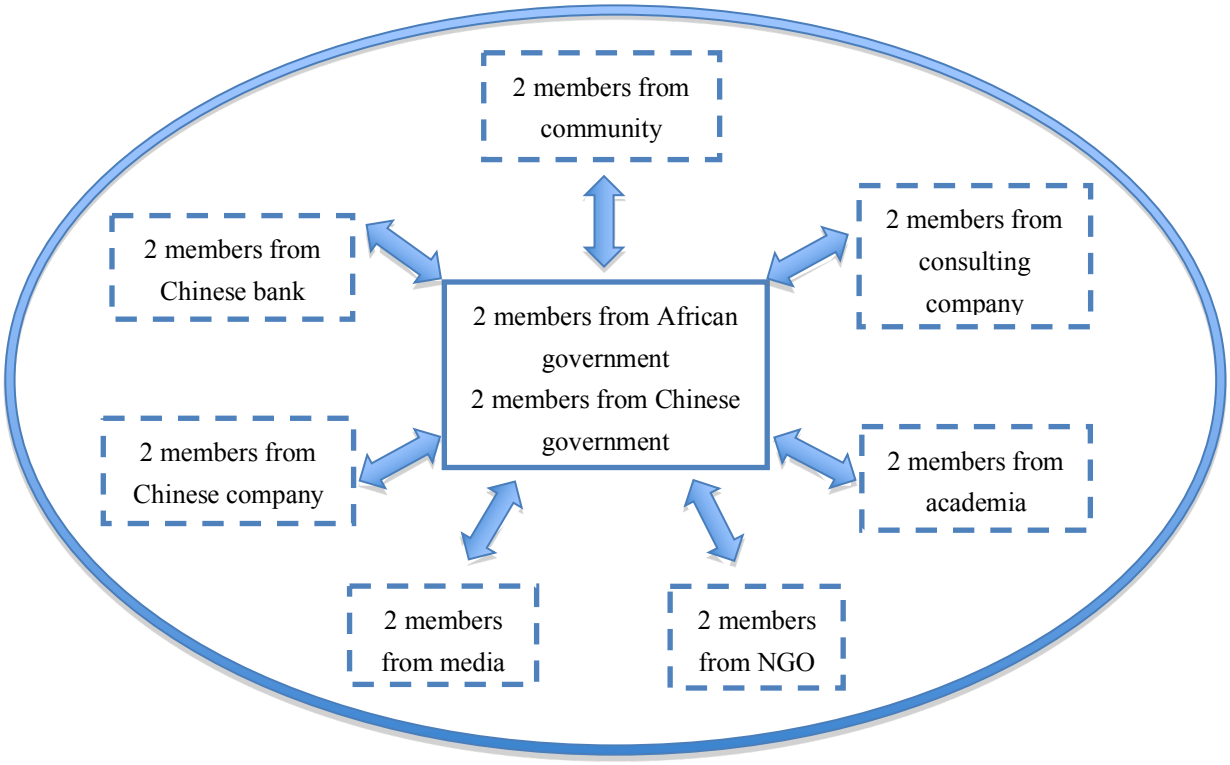

Figure 4.7 Structure of the coordination committee.

Source: Author

The committee should have respectively two representatives from the Chinese bank, Chinese company, third party (consulting company and researcher), key NGOs, and media. Two members are proposed for each category so as to provide supplementary or contradictious opinions. In total, it would be 18 members in one committee. For each major project, the non-government representatives will be changed accordingly. For instance, if it is a port project, the consulting company that has conducted the port feasibility study will be involved, as well as the researchers, NGOs, and media with the expertise on port projects.

4.5.3 Coordination feasibility

The last section introduced the proposed coordination mechanism in the ideal scenario. This section will briefly analyze the cost and benefit for each actor if they participate in the mechanism. Cost-benefit analysis is a widely applied method for advising decision-makers by evaluating the social profitability of projects or

policies (Boardman et al. 2010). Table 4.5 explores the potential cost and benefits for each actor, in terms of both financial and non-financial aspects.

Table 4.5 Cost-benefit analysis of each actor in the coordination mechanism

Stakeholders	Cost		Benefit	
	Financial	Non-financial	Financial	Non-financial
Chinese government	1. More staff cost	1. Extra work	/	1. Securing future contracts 2. Better reputation
African government	1. More staff cost	1. Extra work	1. More economic security	1. Better reputation 2. Better environment 3. More human security
Chinese banks	1. More staff cost	1. Extra work	1. Less loan risks	1. Better reputation
Chinese companies	1. More staff cost	1. Extra work	1. More chances of getting loan	1. Better reputation
Third party (Consulting companies think tanks)	/	1. Extra work	1. More consulting income	1. More contracts from the governments and NGOs 2. Better reputation
NGOs	1. More activity cost	1. Extra work	1. More chances of getting fund	1. Better reputation
Media	/	1. Extra work	1. More income	1. More media coverage
Local communities	/	1. Extra work	1. Proper resettlement compensation 2. Future economic sustainability	1. Better environment 2. Secured community rights 3. Future social sustainability

Source: Author

For the potential cost, most actors are expected to have more expenditure on staff cost or activity cost. But the third party, media and local communities do not have to pay for much extra cost, considering that the media has been trying their approaches to report on this matter, and local communities have already mobilized by themselves to protect their rights in the process. And all stakeholders have to spend more energy and time for this extra work, which is regarded as non-financial cost.

For the potential benefit, except for the media and local communities, most actors will enjoy an enhanced reputation for having paid attention to the ESRs mitigation. African governments and local communities will enjoy better environment and social benefits. And financial benefits are expected for all the non-government actors. Chinese banks will have less loan risks and thus avoid bad debts. Chinese companies through better performing CSR have more chances of getting loans from the Chinese banks according to the policy that there is linkage between the environmental performance of the Chinese companies and their

priorities to get loans from the Chinese financial institutions. Third parties including the consulting companies, think tanks, researchers have the possibility of getting additional paid work from the governments or the NGOs while acting as evaluators for the projects. NGOs though will spend more budget on the activities, yet participating in the coordination mechanism will increase their impacts, and reputation, which will conversely increase their funding opportunities. The media will have chances to produce more media coverage, which will indirectly result in more income. Local communities by joining the coordination to protect their rights in the project process are likely to negotiate more reasonable compensation if resettlement is required.

To conclude, though being part of the proposed coordination mechanism asks for extra staff cost and additional work, various actors will enjoy both financial and non-financial benefits. However, the Chinese actors' lack of interest proved to be an obstacle for the various actors' communication. Thus, it is important to build consensus so as to engage Chinese stakeholders, including the Chinese government, Chinese companies, and Chinese banks.

Based on the interest/power analysis and the past practice in Ghana, the NGOs with high interest can act as the initiator and facilitator, especially international NGOs with a network of governments and expertise in environmental or other related fields. For Lamu Port in Kenya for instance, WWF is working in Kenya with the government, communities and local NGOs, and has expertise in conservation. In setting up the coordination mechanism in Kenya, WWF can act as the initiator and facilitator.

For the first level group discussions, it can be helpful to start with the Chinese government and fully explain the potential benefit for its global reputation. China starts to "going global" – a policy established in the end of 20th century to encourage the Chinese companies to invest overseas – to Africa and other continents as well, and currently promotes the "Belt and Road Initiative". Against this backdrop, the Chinese government would not want to face the critique that China is not a responsible country internationally. Once both Chinese and African country governments form a consensus to make dialogue on this by attending the activities held by the NGOs, the NGOs could invite the media and third parties (researchers and consulting companies) into the process.

The conclusion of this section confirms that the NGOs can play the role of initiator and facilitator at the beginning of setting up the proposed coordination mechanism which aims to address the ESR issues of Chinese ODF funded infra-system projects and promote the sustainability transition.

4.6 Summary

This chapter aims to examine how Chinese donors motivate the Kenyan infra-system regimes by changing its single role quantitatively or qualitatively. And if the role is changing towards sustainable transition, either by itself or through role constellation, it motivates the transition. Without the sustainability perspectives, it hinders the transition.

The results revealed that Chinese actors have changed their single roles in mitigating the ESRs in and beyond the Lamu Port project. However, it varies. Chinese companies have changed their roles quantitatively, by paying attention to the ESRs induced in the project. Though regarding itself only as contractor, the Chinese company has taken the ESR mitigation measures required onto the contractor. The single roles of Chinese government and financial institutions have also changed quantitatively, yet without much qualitative change, such as establishing mandatory legislation and institutions.

Role constellation is rarely observed among the multi-actors, which might be the reason for few role changes in a qualitative way. Therefore, a role constellation model is proposed for multi-actors to coordinate on the ESRs. If Chinese actors could change their role qualitatively through role constellation with other actors within the proposed coordination mechanism and with sustainability perspectives, Chinese ODF niche projects motivate Kenyan infra-system regime's sustainable transition. If not, they hinder the transition.

The discussion on who should take on ESR mitigation responsibility in Chinese ODF-funded projects, whether the Chinese government or the ODF-receiving government, should be put into a broader global context. China is currently intending to formulate its own approach to development cooperation rather than simply copy or adhere to the existing standards set by Western countries, with its Asian Infrastructure Investment Bank (AIIB) and "Belt and Road Initiative" being notable attempts. The Chinese government also emphasizes the importance of empowering the recipient countries with "ownership" in the process of providing the development finance.

Who should take the ESR mitigation responsibilities is likely to be the subject of continued discussion and China might form its own approach in the process. However, it is clear that the Chinese government and companies can no long ignore the environmental and social risks associated with Chinese development finance to African countries, not least because the impacts on local communities are fundamentally at the livelihood level and are therefore likely to become an issue of increasing concerns for negative impacts onto the recipient's infra-system transition towards sustainability.

Chapter 5 International ODF on geothermal project coordination

Renewable energy could offer clean electricity and promote the energy sector's sustainability transition. International ODF has been a critical resource for promoting renewable electricity sources for developing countries. However, we must call for special caution as to how the international ODF operates in renewable energy projects given that one project may involve multi-donors. If the operation of multi-sources in one project is unsustainable, it may undermine the renewable energy transition.

This chapter focuses on the Olkaria I and IV project as a case study to examine how traditional and Chinese ODF could help the energy transition towards sustainability through project coordination. Section 5.1 introduces the geothermal projects and financing coordination situation in Kenya, as well as the research question, hypothesis and methodology. Section 5.2 identifies the actors, examines their roles and changes, and evaluates their relations. Section 5.3 explains the hurdles complicating the sustainability transition and explores the coordination feasibilities, and Section 5.4 summarizes the chapter.

5.1 Introduction

5.1.1 Geothermal in Kenya

With the highest geothermal potential in Africa, Kenya was the first African country to adopt geothermal power back in the 1950s (UNECA 2012). Over 14 potential sites located along the Great Rift Valley with a potential of 7,000-10,000 megawatts (MW) were identified by 2012 (Figure 5.1, left). The Government of Kenya (GoK) projects its geothermal capacity to reach 5,500 MW by 2030, although as of October 2014 Kenya has an installed capacity of 340 MW. To achieve the 2030 goal, it will cost an estimated USD 18 billion (Ngugi 2012). Geothermal Development Company (GDC), the main geothermal developer facilitated by GoK, will raise USD 6 billion through credits, budget and revenues. Kenya Electricity Generating Company Limited (KenGen) and the Independent Power Producers (IPPs) will raise USD 12 billion for power plants. By 2012, the GoK contributed USD 399 million, while the multilaterals, bilateral and other funds committed USD 1.343 billion (Ngugi 2012), indicating a financing gap of USD 16 billion.

Among renewable energy options, geothermal is the most reliable, with a load factor of over 90 percent and production of a steady power output around the clock. However, geothermal typically needs five to seven years to become operational from permit until commission (Serdjuk *et al.* 2013). Validating

geothermal through test drilling is not only capital intensive but also highly risky due to the probabilities of failed drilling, thus commercial financing is hard to find (Audinet 2013). This is especially true in Africa where local investors face pronounced regulatory and macroeconomic risks. This is why only international donors have provided the financing effectively (UNEP FI 2012) despite of a range of public support schemes for private investment.

To focus on a few financiers this chapter will examine the Olkaria I and IV geothermal project (Figure 5.1, right), given its high volume of 240 MW marking it the single largest geothermal project in the world with enormous investment involving the GoK, KenGen, International Development Agency (IDA) of World Bank, European Investment Bank (EIB), Japan International Cooperation Agency (JICA), Agency for French Development (AFD), Development Bank of Germany (KfW), and China Export-Import Bank (China EXIM) (SREP 2012).

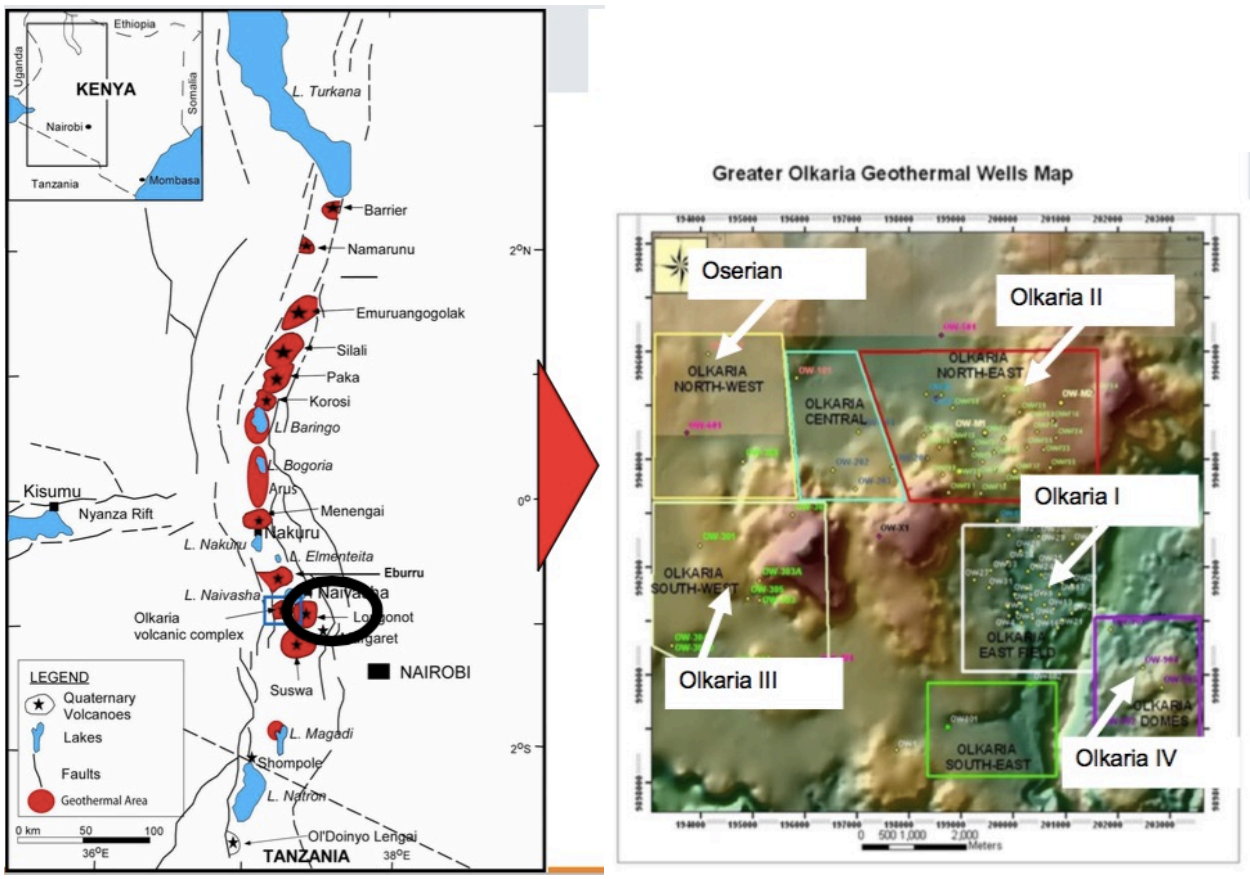

Figure 5.1 Map of geothermal areas in Kenya and Olkaria wells.

Source: Karingithi, 2012, Page 32.

5.1.2 ODF coordination in Kenya

In the early 1970s the World Bank organized a Consultative Group (CG) among various donors and GoK in the early 1970s, and held CG meetings once every two years, with the last one in 1996. It was not until 2004 that the World Bank facilitated aid coordination, establishing the Harmonization, Alignment, and Coordination (HAC) Group as a subgroup of the Donor Coordination Group (DCG). Seven bilateral and multilateral agencies joined, with the World Bank as permanent co-chair (Fengler and Kharas 2010).

In 2009 the Aid Effectiveness Group (AEG) replaced HAC. It is rooted in the External Resources Department, Ministry of Finance, with increased participation from the Planning Ministry and the then Prime Minister Office and other line ministries. AEG reports to the Development Partnership Forum (DPF) on the aid and development effectiveness agenda. All these efforts are supported by the Aid Effectiveness Secretariat (AES), which replaced the HAC Secretariat in 2010 (Treasury 2016).

From the beginning of the Kenya Joint Assistance Strategy (KJAS) period, the HAC/AEG group comprised 17 Development Partners (DPs) with GoK. They are Canada, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Norway, Sweden, Spain, the United Kingdom, the United States, and the African Development Bank, the European Commission, the United Nations, and the World Bank Group. China has been participating as an observer (Treasury 2016). With Kenya's external financing representing 16 percent of its total 2013-14 budget, the role for AEG is to leverage the knowledge and financing of DPs. The implementation of the devolved governance system as per the Constitution in 2010 poses challenges to aid co-ordination (Treasury 2016). Notably, China did not join the DCG. It negotiated directly with GoK. Figure 5.2 depicts the aid coordination structure in Kenya.

A sectoral approach is adopted in Kenya, as in many African countries. However, the Sector Working Groups (SWG) in Kenya have been "loose networks without clear terms of reference" (Fengler and Kharas 2010:124). Two programs out of the three in Figure 5.2 have been much studied by scholars: 1) The GJLOS Program in 2003-2008, funded by 16 donors, included four reform priorities: Governance reforms, human rights reforms, Justice reforms, and Law and Order reforms (GJLOS). One evaluation by McCormick & Schmitz (2011:163) said that "there is no effective SWG for the governance reform"; 2) The health sector reform in 2007-2012 was "in a fledging sector-wide approach" (Fengler and Kharas 2010:124). The energy sector has not been analyzed yet by scholars.

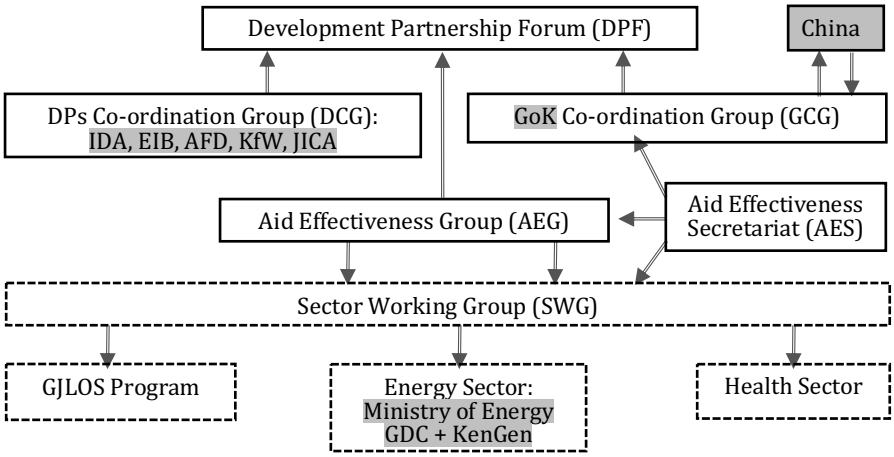

Figure 5.2 Aid Co-ordination Structure in Kenya

Note: DPF, AEG, and AES includes GoK and DPs. DCG includes DPs and Ambassadors. GCG is GoK only. Grey blocks are the key players in Kenya's geothermal ODF co-ordination.

Source: Author compilation based on McCormick (2008), Fengler and Kharas (2010), Kapika and Eberhard (2013), Treasury (2016).

5.1.3 Research question, hypothesis and methodology

This chapter asks the question of how traditional and Chinese donors through their geothermal projects motivate infra-system regime's transition towards the sustainability. The hypothesis is that traditional and Chinese donors motivate the Kenyan infra-system regimes by role change and role constellation with sustainability perspective. If the role change and constellation are in line with sustainable transition, they motivate the transition. If without, they hinder the transition.

This research is an empirical study. Three sources of evidence for case study research are utilized, with interview composing the primary data, and documents and archival records functioning as the secondary data. Each source of evidence has strengths and weaknesses, and none can be seen as better than others (Yin 2003). Nine key informant interviews provided primary data, with two from KenGen and GDC in Nairobi in March 2015, three from KenGen, GDC, and JICA in Nairobi in September 2015, and one from the Public Private Infrastructure Advisory Facility (PPIAF) of World Bank Groups (WBG) in Nairobi in October 2016. Further interviews were held with another three staff from International Development Association (IDA) and Multilateral Investment Guarantee Agency (MIGA) of WBG in Washington DC in December 2016.

5.2 Actors, roles and relations

5.2.1 Actors

As the single largest completed geothermal project in the world, the Olkaria I and IV project consists of 140

MW for Unit 4 and 5 of Olkaria I, and another 140 MW for Olkaria IV. Started in 1998, the project finally achieved commercial operation in early 2015.

Table 5.1 shows the financing breakdown of this project by 2012. Power plant and drilling require the most investment, and there seems to be two clearly divided groups: GoK, KfW and China funded the drilling, while JICA, EIB and AFD funded the power plant. The drilling contractor for this project is the China Great Wall Drilling Company, and its backer the China Export-Import Bank (China EXIM) offered a USD 97 million loan (Simiyu 2013).

Table 5.1 Financing Breakdown for Olkaria I and IV by 2012

Unit: USD million	Olkaria I	Olkaria IV	GoK	KenGen	IDA	JICA	KfW	EIB	AFD	China	Total
Drilling Costs	142	186	216				15			97	328
Steam Field	100	68		7	107		54				168
Power Plant	201	194				201		76	118		395
Substation & Transmission	22	13	3					32			35
Consultancy	16	14					30				30
Admin	20	21		29	12						41
Resettlement Action Plan		10		10							10
Board of Consultants	1	1			1						1
Indirect Cost	24	33		57							57
Total	526	540	219	103	120	201	99	108	118	97	1065

Note: actual disbursement remains unpublished.
Source: Author compilation based on SREP (2012).

5.2.2 Actors' roles and changes

Table 5.2 presents aid modalities concerning this project, in terms of aid co-ordination, compliance with DAC policies on ODF definitions, transparency, conditionality, and environmental and social (E&S) policy, ODF volume in Kenya generally and the Olkaria I and IV projects particularly, the interest rate, payment period, grace period, and tied goods and services.

Table 5.2 The ODF Result for Olkaria I and IV

Player / Modality		IDA	EIB	AFD	KfW	JICA	China EXIM
Aid Co-ordination		Yes. WB country director acts as donor co-chair of DPF					No. As observer[1]
ODF definitions		Mainly ODA (concessional funding with grant part of at least 25 percent, and primarily for promoting welfare and economic development); Report the full value of ODA loan.					Mainly OOF; Report only the interest subsidy
Transparency		Report ODA to DAC; OOF is regarded as confidential					No country data
Conditionality		Conform to an agreed set of standards on governance, human rights, good economic policy					No political conditionality
Environmental and social safeguard		E&S framework or policy or principle, require Environmental Impact Assessment (EIA), enforced with evaluation and monitoring policies					Guideline exist, require EIA, not enforced
Volume[2]	Kenya[3]	477.57	200.84	92.29	105.7	45.9	/
	Olkaria[4]	330	101	87	63	300	97
Interest rate & payment period & grace period[5]		1% for first 10 years, 2% for last 20 years	3%, 15 years, 5 years	1.95% + LIBOR[6], 15 years, 3 years	0.75%, 30 years, 10 years	0.2%, 30 years, 10 years	>4%[7], 15-20 years, 5-7 years
Tied with goods and services		Un-observed or un-disclosed				Toyota Tsusho with Toshiba turbines.	China Great Wall Drilling drilled 26 wells.

Note:

1. China can also be represented by Ministry of Foreign Affairs. One JICA staff in the interview in September 2015 claimed the absence of Chinese actors in DCG meetings. A senior officer from GDC echoed this fact.
2. Unit: USD million.
3. Total net ODA data of 2014 to Kenya. Source: OECD statistics. Only ODA, since OOF is not recipient country based. Net ODA or ODF data in 2014 from China is unknown.
4. Total planed ODF to Olkaria I and IV projects from 2010-2015. Source: JICA Annual Report of 2014, IDA website, e-ProMIS Kenya of National Treasury.
5. The data of JICA and China are Olkaria I and IV. Source: JICA report and AidData. Other data are for Olkaria projects since I & IV data are unknown. Source: Mwangi 2008.
6. LIBOR stands for Intercontinental Exchange London Interbank Offered Rate.
7. In the informant interview a senior officer from Kenya GDC disclosed this rate.

Sources: Treasury (2016), Brautigam (2010), and the homepages of each donor.

For aid modalities, traditional donors in principle comply with the DAC regulations and guidelines on

ODA, namely, definition of ODF; transparency on reporting ODA to DAC; conformability to an agreed set of standards on governance, human rights, good economic policy governance, human rights, and the establishment of environmental and social (E&S) safeguard policies that require an Environmental Impact Assessment (EIA) and its enforcement. In contrast, as it is not a member of OECD, China is not required to abide by the DAC standards on transparency, governance and human rights, and E&S safeguards.

China EXIM Bank recently implemented environmental and social safeguard policies, but the requirements are less stringent and enforcement is less strict than for DAC donors. In comparison with other financiers, China EXIM Bank has the highest interest rate and focuses on drilling, which seems to maximize economic profits of Chinese companies in recipient countries, and at the same time African countries are urged to rebalance their economic profits in the relations (Pigato and Tang 2015; Wang and Bio-Tchane 2008).

Germany, as the only OECD financier for geothermal drilling, stresses maximizing the development outcomes of RE as well as other sectors, subject to DAC guidelines on transparency, accountability and social and environmental safeguard policies (KfW 2016; BMZ 2016).

Japan, though it agreed not to provide tied aid as a DAC member, in 2002 established the Special Terms for Economic Partnership (STEP) for its loans, for which Japanese technologies and equipment are substantially utilized. Power plants are an eligible field (JICA 2013). Thus, JICA, with the lowest interest rate and only focusing on power plants in Olkaria I, maximizes its presence in power plant practices, also subject to DAC guidelines.

France and EIB, co-funding Olkaria IV power plant, could be ranked in between Germany and Japan in terms of interest rate, and subject to DAC guidelines as well (AFD 2014; EIB 2016).

The World Bank, focusing on geothermal stream field and administration, tries to maximize aid effectiveness through aid co-ordination while providing its own development assistance, subject to the maximization strategy of each donor (World Bank 2000).

Despite apparently strong E&S regulations by all donors, Kenya still saw this project producing hydrogen sulphide gas, trace metals like boron, arsenic, and mercury, and noise in the Hell's Gate National Park (Mwangi 2010), and resettling affected populations and the associated disruption of the social fabric of the community being resettled (Mwangi-gachau 2011). Thus, Kenya maximizes renewable energy financing, yet is subject to E&S safeguards.

In this geothermal project, no changes of Chinese roles or traditional donors' roles could be observed in

terms of coordinating their ODF in one project, such as on co-negotiation with Kenyan actors in the project implementation and E&S mitigation and safeguard.

5.2.3 Actors' relations

Three key findings are summarized in terms of multi-actors' relations: 1) China, invited as an observer of DCG meetings, in reality pursues a bilateral approach with the GoK; 2) The E&S regulations by all donors in the Olkaria I&IV geothermal project did not prevent Kenya from E&S complications; 3) Co-operation and coordination among DAC countries is rather limited.

Reasons for Chinese actors' absence from DCG meetings could be multifaceted. First, the Chinese actors lack strong interests in working together with traditional donors at the project level. The lack of clear regulations or guidance on who shall lead or represent the Chinese ODF implementation agency is another realistic barrier. Second, the traditional donors are not prepared to welcome the new comers to its donor club, or are still exploring the ways to work with the emerging donors who used to be recipients. Third, the Kenyan government may gain some leeway and obtain aid negotiation capital in working separately with two groups of donors.

Though the Chinese actors should enhance its E&S regulations in their funded projects, the E&S regulations by the traditional donors seem also imperfect to prevent all the recognized ESRs. It seems the implementation of these regulations shall be further monitored. Another reason might be that the Kenyan government has a similar passive and delaying treatment on the ESRs in the geothermal project as with the Lamu Port Project, stressing mainly on the economic and social benefits of these infra-system projects and tending to neglect the accompanying environmental and social risks alongside.

Coordinating the ODF from various donor actors in one project seem rather challenging, even without the emerging donors. The DCG meetings are more like an information sharing platform, according to an interview with a manager from the Geothermal Development Company who attends these meetings. During the DCG meetings, the Kenyan actors release projects information and calls for support. There remain to be further efforts on coordinating the multi-donors in transforming the recipients' infra-systems.

5.3 Towards sustainability transition

The role constellation among the donor actors in Kenya's geothermal projects is insufficient to produce single role change: unobserved between traditional and Chinese donor actors, and rather limited among the

traditional donors. This creates hurdles for the renewable energy sectors' sustainability transition. This section proposes a trilateral cooperation model in the geothermal projects, and analyzes the feasibilities and conditions for changing the single roles of involved actors.

5.3.1 Proposed cooperation mechanism

Trilateral Cooperation

Cooperation modalities between traditional and non-traditional partners are always changing. Trilateral cooperation is one of these cooperation modalities. It has existed for decades embedded in bilateral, regional and global programs, such as Brazil-Japan-Third countries in the 1970s, or Germany-China-Mali in the 1980s. Since 2000 there has been an increase of triangular cooperation, and it is deeply rooted in the discourses of international donors (Piefer 2014).

There is no agreed international definition of trilateral or also named triangular cooperation. According to the Japanese Ministry of Foreign Affairs, South-South Cooperation means cooperation between developing countries for development. Developing countries have restrictions on its capabilities. In such cases, the developed world supplements the cooperation with technology, funds, experience and knowledge (Japan MOFA 2011).

Figure 5.3 gives an example of the relationship between countries in trilateral cooperation. A indicates a developed country that provides assistance. B indicates a developing country that provides assistance. C indicates a developing country that receives assistance.

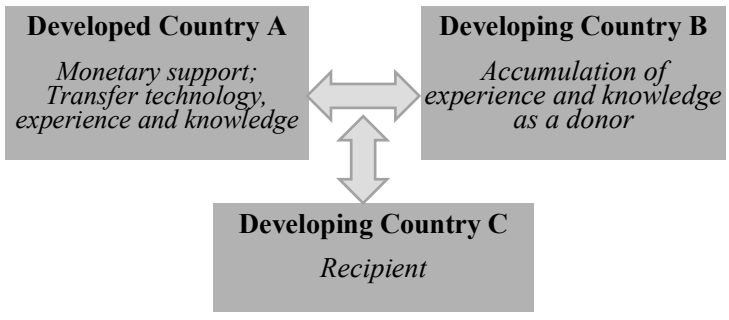

Figure 5.3 The flow of trilateral cooperation.

Source: Author compilation based on Japan MOFA (2011)

Different actors have various reasons to participate in trilateral cooperation. It is believed that "it is important as a gateway to a new form of international cooperation" (Kato 2013:2). OECD studies figured out the conditions to achieve positive results from trilateral cooperation: 1) beneficiary countries ownership of projects and active participation; 2) projects are aligned with beneficiary countries' development priorities; 3) partners divide responsibilities to make best use of their comparative advantages. It is also argued that triangular cooperation may incur higher transaction costs, even if services and technologies provided by developing countries may be less expensive (Fordelone 2008).

Proposal of one trilateral co-operation on geothermal drilling

As current aid relations feature segregation between traditional donors and Chinese actors, a first-hand option is to remove such segregation entirely. However, this can be rather challenging at the national level. An alternative is to enhance complementarity between traditional donors and Chinese actors through trilateral co-operations at the project or sectoral level. One possible area may be co-financing for geothermal, as both Germany and China funded the drilling. Although other scenarios may exist as well, such as with Japan and China, this section only looks at the Germany-China co-operation scenario given the importance of drilling in the geothermal project cycle.

In terms of total installed geothermal electricity in 2015, neither China or Germany ranked in the top 15 in the world (Bertani 2015). However, in terms of total direct usage of geothermal energy, such as space heating, bathing, in 2015 China ranked first and Germany ranked fourth, after the U.S. and Turkey (Lund & Boyd 2015).

Germany's incentives of financing geothermal drilling may be based on two facts: in 2003 Munich Re Group was the world's first insurer to cover the costs of unsuccessful geothermal drilling projects and; and Germany is the only European country that has established private and national geothermal risk insurance funds, covering home and abroad (Fraser et al. 2013). Geothermal risk insurance is one of the key incentives for geothermal development. Meanwhile, Germany through KfW with African Union Commission in 2012 co-established the Geothermal Risk Mitigation Facility to fund geothermal development in eleven African countries including Kenya.

China has drilling technology advantages. The on-site drilling experiences for direct usage domestically allows Chinese drillers to practice drilling. The China Great Wall Drilling Company, the contractor for the Olkaria IV project, claimed its successful test drilling rate goes up to 100 percent, while the world average is

from 60 to 78 percent. Additionally, Chinese company construction speed is 35 percent faster than others due to technical advantages, which is claimed by China Great Wall Drilling and confirmed by one KenGen technician in the informant interview.

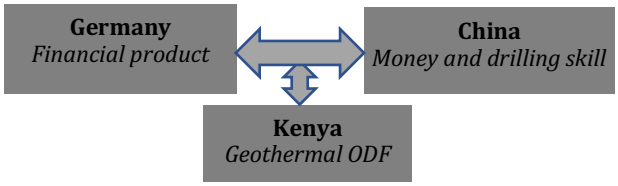

Figure 5.4 Trilateral cooperation on geothermal drilling financing

Source: Author

It seems both Germany and China have their own approaches to lower geothermal drilling risk. Possible trilateral co-operation between Germany and China in Kenya is outlined in Figure 5.4, in which Chinese banks and German exploration risk insurance companies co-operate on a geothermal drilling loan package for Kenya, with money and drilling skill from Chinese actors, and exploration risk insurance from Germany.

5.3.2 Cooperation feasibilities

Net benefits of the trilateral co-operation on geothermal drilling

The role changes without and within the proposed trilateral co-operation are shown (Figure 5.5). The arrows among German financial institutions, drillers and Kenya are lighter in color, which indicates there has been no evidence showing such connection. To examine the possibilities of this co-operation, cost-benefit analysis was done in terms of financial and non-financial aspects (Table 5.3).

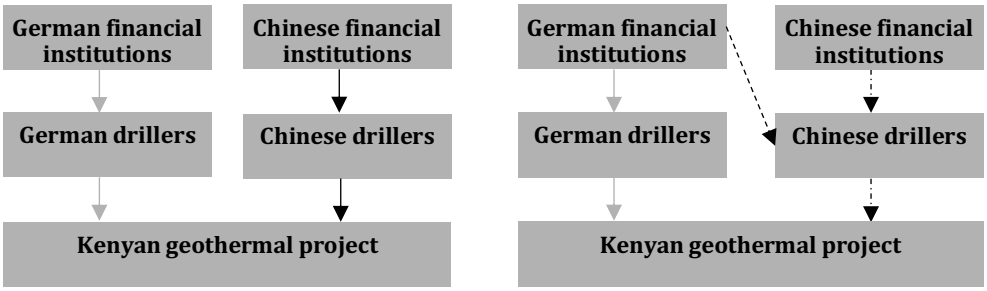

Figure 5.5 Relations without (left) and within (right) trilateral co-operation

Source: Author

Table 5.3 Cost-benefit of each actor in the trilateral cooperation

Player		Cost		Benefit	
		Financial	Non-financial	Financial	Non-financial
China	Government	More staff cost	Extra work; Lose sovereignty; More stringent E&S safeguard policies	Less risk of default	Better reputation
	Banks	More staff cost; More loans	Extra work More strict sanction in case of drillers' incompliance with E&S policies	More business opportunities	Better reputation
	Drilling companies	More staff cost; Possible loss in competition	Extra work; Comply with more stringent E&S guidelines	More chances of getting loan	Better reputation
Germany	Government	More staff cost	Extra work	/	Better reputation
	Insurance companies	Possible increase E&S risks by Chinese driller	/	More income	More successful cases
	Drilling companies	Possible loss in competition	/	More loans chances from Chinese banks	/
Kenya	Government	Slower loan disbursement	/	Increase geothermal power quickly	Less co-ordination; Less E&S risks
	Geothermal companies	/	/	Less staff cost; Cheaper loan	Less co-ordination
	People	/	/	Increasing access to RE	Less E&S risks

Source: Author

Germany may lose if the Chinese EXIM Bank does not increase the amount of untied ODF. In this case, the provision of re-insurance to a Chinese driller will simply replace other drillers including German ones, though the current level of drilling practices among German drillers in Kenya is limited. Another condition could be the stringent and enhanced enforcement of environmental and social safeguard polices for Chinese actors. The price of insurance will become higher if Chinese driller encounters local protests for noncompliance with E&S policies, which makes both China and Germany lose, and the same for Kenya.

In the scenario satisfying these two conditions, the payoff seems most beneficial mainly for Chinese actors: lowering loan default risks, and improving their reputation as a responsible international community member. This is potentially offset by finding impediments in pursuing its national objectives, and that all Chinese players have to spend more staff cost and extra work.

The German government at the initial stage has to coordinate with Chinese counterparts to activate this co-operation. For German insurance companies, since they are seeking business opportunities, there will not be extra staff cost or work. The Exploration Risk Insurance (ERI) by Munich RE Group covers the costs of

wells in unsuccessful exploration. The German insurance company evaluates the projects before the agreement, and it remains unknown whether the involvement of German drillers make the project more insurable and to what extent. Thus, it is uncertain whether the German drillers will definitely lose. To date, no German driller has operated in Kenya. The investors in Kenya, such as KenGen, and Akiira, a special purpose vehicle owned by a Kenyan-U.S.-Denmark consortium, could purchase the ERI package, secure financing and find a driller.

Kenya could enjoy a finance package with more security against risk, and bear almost no loss. Instead, the Kenyan players will save some staff cost from the current heavy co-ordination with multiple donors, in this case two donors. What is more, current environmental and social risks caused by various financiers in geothermal projects might be paid more attention to, or even to some extent mitigated, as long as the trilateral co-operation pushes Chinese players to implement more stringent social and environmental safeguard policies with stricter enforcement.

To conclude, co-operation between Chinese drillers and German insurance companies would accrue financial and non-financial benefits for both, and this pattern benefits all provided that China increases untied ODF, and enhances their environmental and social safeguard standards in the energy sector. Aid coordination, through trilateral cooperation, can help reduce transaction cost for Kenyan actors, improve efficiency in mobilizing drilling finance, and help the Kenyan population access electricity from renewable energy.

Cross-check with three pre-studied conditions for positive trilateral cooperation

This section discusses whether the proposed Germany-China-Kenya trilateral cooperation, compared with non-cooperation scenario, improves the three conditions said to lead to positive cooperation by Fordelone (2009): 1) beneficiary countries ownership of projects and active participation; 2) projects are aligned with beneficiary countries' development priorities; 3) partners divide responsibilities to make best use of their comparative advantages.

1) Empowering Kenya's ownership

Ownership, mostly referring to the scope of national level, indicates the sources of leverage the recipients have been able to bring to bear in negotiations with donors, and the degrees of control that the recipients have been able to exercise over the policies agreed in negotiations and those implemented after agreements (Whitfield & Fraser 2010). Given that the proposed trilateral co-operation is at sectoral or project

level, it is hard to measure change to national level ownership.

The Germany-China financing cooperation on geothermal drilling may result in either empowering or violating Kenya's ownership. If the Kenyan energy sector has enough sources of leverage in negotiations with Germany and China, the trilateral co-operation may further empower Kenya's ownership in the energy sector, and vice versa. Therefore, whether this trilateral cooperation leads to positive or negative results depends largely on Kenyan national ownership per se. The empowerment of country ownership is beyond the scope of this paper. Nonetheless, the implication is that the analysis of trilateral co-operation at sectoral level has to take ownership at the national level into consideration.

2) Aligning better with Kenya's development priorities

Kenya has set ambitious goal to develop geothermal so as to increase its electrification rate and provide clean electricity for the Kenyan. The proposed trilateral cooperation is believed to be able to help realize its development priority of utilizing geothermal for electricity in two ways.

On one hand, the trilateral cooperation may help shift Chinese energy investment in Kenya from hydro power or another fossil fuel to geothermal. Currently Chinese energy infrastructure financing also goes to hydro power sector, such as the High Grand Falls Dam which is to be the largest dam in Kenya. With financial support from German insurance companies, geothermal financing from China may increase in the geothermal sector. Hence, the Chinese energy financing in Kenya would be better aligned with Kenya's development priority.

On the other hand, the trilateral cooperation could help expand Chinese drilling areas with financial support from Germany. At present, Chinese drillers with Chinese ODF mostly practice in the Olkaria region, a fairly well-developed geothermal field. With the drilling insurance covering failed test drillings, the Chinese drillers may practice beyond Olkaria and to broader geothermal fields along the Great Rift Valley, which therefore is in line with Kenya's development priority.

3) Utilizing their comparative advantages

As analyzed previously, Germany is one of the leading countries in providing geothermal insurance to cover the failed test drillings, while China has experienced geothermal drilling companies. The proposed trilateral cooperation combines the comparative advantages of both countries. Most importantly, this combination will provide geothermal drilling finance for Kenya, which faces challenging to raise finance, especially for the drilling phase of the entire flow of the geothermal project.

5.4 Summary

The current role constellation between Chinese and traditional donors in the Olkaria I and IV geothermal projects is limited, which suggests that sustainability perspective is not much considered, and this may hinder the sustainability transition of infra-system regime. The proposed trilateral cooperation could affect the donor actors' role constellation towards sustainability transition, because it requires Chinese actors to adjust themselves to the DAC policies to some extent on transparency, untied aid and environmental and social safeguard policies.

Complying with DAC's ODF definitions for Chinese actors may require a thorough philosophical change on development assistance. Brautigam (2011) reckoned that the DAC sees foreign aid as important for development in the poorest countries, while the Chinese see investment and infrastructure as central. The transparency of Chinese ODF should be improved, however, Chinese players have many concerns to not disclose the country level ODF data. As Grimm *et al.* (2011) analyzed, the recipients actually released Chinese ODF data at the project and country level.

In the proposed trilateral cooperation, the ODF definition and transparency may not matter to a large extent, however Germany may lose if the Chinese EXIM Bank does not increase the amount of untied ODF in the sector. In this case, the provision of re-insurance to a Chinese driller will replace other drillers including the German ones. Theoretically, the break-even requirement is one of the most influential conditions for cooperation (Sexton 1986). Thus, this trilateral cooperation exists with one critical condition that all the drillers are at the same starting line, which could be satisfied while China increases its untied ODF for drilling.

Another condition could be the stringent and enhanced enforcement of environmental and social safeguard polices for Chinese actors. Dinar, Albiac and Sanchez-Soriano (2008) reckoned that environmental problems stem from non-cooperation among interdependent agents driven by their own incentives, and "cooperative solutions could result from binding agreements with built-in penalties". In the proposed cooperation, the price of insurance will become higher in case Chinese driller encounters local protests for noncompliance with E&S policies. In this case, both China and Germany lose, as does Kenya. Thus, the Germany-China cooperation should include the requirement that both make binding agreements on minimized standards on environmental and social safeguards, with associated penalty policies.

To satisfy these two conditions, Chinese actors will bear considerable costs. However, the trilateral cooperation model is in line with recent official declarations on cooperation with a third country between

China and Germany, France, and also Canada. For instance, China and France offered to cooperate to finance and insurance in public and private financing towards a third country. They agreed on a joint fund for Africa where France has traditional strength. On the other hand, China's ODF enables the GoK to exploit maximum benefits from the competition between traditional donors and China through leveraging negotiation capital with donors. This can work for both sides: to intensify the competition and to provide incentive for collaboration.

These dynamics manifest the complexity of aid coordination between traditional donors and China in co-funding projects. Though it is not yet ready to obtain overall aid coordination, the trilateral cooperation at sector or project level can be the first step for China and traditional donors to explore and understand mutually, and to change their single role qualitatively in the role constellation, leading to the energy sector's sustainability transition for the recipient countries.

Chapter 6 International ODF on renewable energy transition

Different natures of niche innovators affect actors' role constellation divergently, and hence affect the infra-system transition in developing countries. For instance, Marquardt et al. (2016) found that donors' intervention in Morocco is more successful than in the Philippines, because the cooperation in Morocco is beyond the niche project level but on the regime level, which facilitated the inclusion of renewables into the national energy strategy and the launch of the Moroccan solar and wind plans.

The previous two chapters reviewed the role of the Chinese donor actors and their relations with traditional donors in the infra-system's sustainability transition in Kenya. This chapter aims to aggregate the traditional and Chinese donors as a whole in international finance, so as to examine their roles, and interaction with Kenyan actors in the renewable energy transition, and to test how the international ODF actors through their projects motivate the renewable energy regime transition in Kenya.

Section 6.1 summarizes renewable energy in Kenya, and introduces the research question, hypothesis and methodology. Section 6.2 analyzes the electricity sector reform and dynamics of landscape, regime and niche in the energy transition. Section 6.3, through three recent niche novelties and their interaction with regimes, explores the hurdles towards future transition. Section 6.4 summarizes the chapter.

6.1 Introduction

6.1.1 Renewable energy in Kenya

Kenya is well-endowed with renewable energy. Over 14 potential geothermal sites locate along the Great Rift Valley with a potential of 7,000-10,000 megawatts (MW), the highest potential in Africa. Naivasha region witnesses the single largest geothermal project in the world – the Olkaria I&IV (280 MW), and the first private sector greenfield geothermal project in Africa – the Akiira (70 MW). Meanwhile, the Lake Turkana region in 2015 saw the construction of the largest single wind power project in Africa, with an expected installation of 365 wind turbines, and a total of 310 MW of wind energy to the national grid upon completion in 2017 (LTWP, 2017).

For Kenya, the local renewable energy resources (wind, hydro and geothermal) are the cheapest compared with imported non-renewable resources (nuclear, coal, oil and gas). Figure 6.1 displays the generation costs of candidate units by components in 2010, without the consideration of their load factors. It

consists of: 1) fixed costs, such as initial capital cost, operation and maintenance (O&M), outage adjustment; 2) variable costs including fuel, CO_2 cost, and variable O&M. The reference forecast scenarios are: crude oil price=90 USD/barrel, coal price=100 USD/ton, natural gas=9.11 USD/gigajoule (GoK 2011).

If considering load factor, namely the highest one attainable for each type of candidate in Kenya, the Levelized Cost of Energy (LCOE) is obtained (Table 6.1). LCOE is an economic assessment of the cost of the energy and includes all the costs over its lifetime: initial investment, operations and maintenance, cost of fuel and cost of capital. The candidates are categorized according to the type of supply – base load and peak load. Two discount rates are considered – 8 percent for base case and 12 percent for sensitivity analysis.

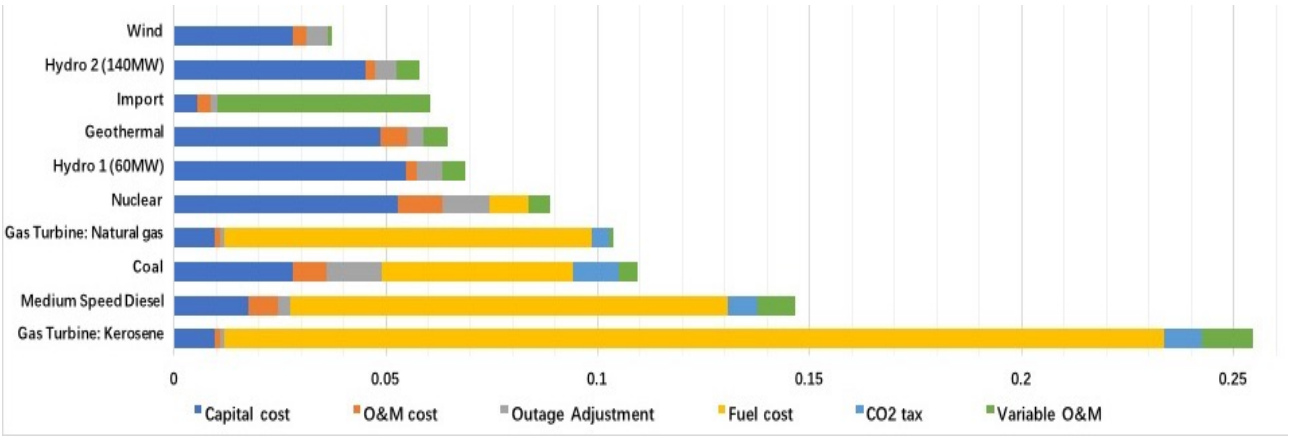

Figure 6.1 Generation cost of candidate units by composition in 2010 in Kenya, unit in USD/kWh
Source: Author compilation based on GoK (2011).

Table 6.1 LCOE ranking of candidate units with a given load factor in 2010 in Kenya

Discount Rate Scenario		8%		12%	
Candidate Units	Load Factor	USc/kWh	Ranking	USc/kWh	Ranking
Base Load Projects					
Geothermal	93%	6.9	1	9.2	1
Nuclear	85%	10.2	4	14.5	5
Coal	73%	12.7	7	14.9	6
Imports from Ethiopia	70%	6.5	-	6.8	-
Hydro 1 (60 MW)	60%	11.1	5	16.8	7
Hydro 2 (140 MW)	60%	9.3	3	14.1	4
Gas Turbine: Natural gas	55%	11.3	6	12.0	2
Wind	40%	9.1	2	12.2	3
Peak Load Projects					
Medium Speed Diesel	28%	21.7	9	24.1	9
Gas Turbine: Natural gas	20%	15.1	8	17.0	8
Gas Turbine: Kerosene	20%	30.2	10	32.1	10

Source: Author compilation based on GoK (2011).

Though the imported resources are expensive in terms of total cost, the initial capital cost is much lower than the local resources in Kenya. And uncapping the local renewable resources require a great deal of initial capital cost given the attributes of these renewable energies (Figure 6.1).

As acknowledged by GoK (2011), the local energy resources (geothermal, wind and hydro) are the most economically attractive at an 8 percent discount rate. While at 12 percent, gas turbine using natural gas become more attractive than wind. Imported resources (nuclear and coal) are more expensive than local resources in both discount rate scenarios. Though the imports from Ethiopia are cheaper than geothermal, it could be subject to unforeseen price fluctuations and unexpected unavailability, and the variable O&M cost is the highest among all as indicated.

6.1.2 Research question, hypothesis and methodology

This chapter asks the research question on how international donors through their renewable energy projects in Kenya motivate the renewable energy regimes towards the sustainability transition. It holds the hypothesis that international donor actors motivate the recipients' regimes by active role constellation with Kenyan recipient actors. If the constellation is in line with sustainable transition, they motivate the transition. If without the sustainability perspective, they hinder the transition.

Similar to Chapter 5, this chapter can be classified as an empirical case study, and adopts interviews for the primary data, and the documents and archival records as the secondary data. Six key informant interviews were conducted, with three staff from KenGen, Akiira Geothermal Project, and the Public Private Infrastructure Advisory Facility (PPIAF) of World Bank Groups (WBG) in Nairobi in October 2016, and three staff dedicated to the energy sector reform from International Development Association (IDA) and Multilateral Investment Guarantee Agency (MIGA) of WBG in Washington DC in December 2016.

6.2 Landscape, regime and niche dynamics

According to the multi-level perspective sustainability transition theory, interactions are outlined between landscape, regimes, and niche novelties in which actors employ the geothermal and wind technologies in Kenya. First, the electricity sector regime is described regarding how it has been shifted by the landscape. Secondly, a more detailed interaction among landscape, regimes, and niches is presented for the period of 1954-2016, with three stages elaborated in a table (Appendix 8).

6.2.1 Electricity sector regime shifted by the landscape

The electricity sector regime in Kenya in the past decades has been shifted by the global landscape on electricity sector reform based on neo-liberal concepts, and the trend of adopting feed-in-tariffs (FiT) as incentives to investment in renewable energies.

Commencing in Chile in 1982, the liberalization and privatization of the electricity sector, swept over developed and developing countries in 1990s and still evolves nowadays (Nagayama 2012). The reform is often characterized as involving: 1) the introduction of competition, through structural changes such as the removal of subsidies, vertical unbundling of integrated utilities to facilitate non-discriminatory access to monopoly networks, and horizontal unbundling of incumbents to create viable competitors; 2) the establishment of independent energy sector regulators; 3) often but not always, the privatization of state-owned energy assets (Pollitt 2012).

According to the World Bank definition, unbundling, also referred to as restructuring in nascent reform documents, is the act of disaggregating the total electric service provided by a power utility into its basic components and offering to sell each service separately with separate rates for each component. Thus, generation, transmission, and distribution services could be functionally unbundled into separate entities and offered as discrete services (Besant-Jones 2006).

Electricity sector reform in African countries has taken place in varying ways and to divergent extents, but no country has fully implemented all the standard models: corporatization, commercialization, requisite legislation, independent regulator, sector restructuring, Independent Power Producers (IPPs), divestiture of generation assets, divestiture of distribution assets, and competition (Kapika & Eberhard 2013a). While there are examples of unbundling and divestiture, no African country has wholesale or retail competition in its electricity industry. Of the present 59 IPPs that have closed financially as of 2016, Kenya and Uganda have the highest number, with each possessing 11 IPPs (Eberhard et al. 2016).

As many other countries in and beyond Africa, the electricity sector reform in Kenya is rolled out against the vast backdrop of Structural Adjustment Programs (SAPs) proposed and promoted by World Bank Group (WBG) and International Monetary Fund (IMF) in the 1980s. The belief in liberalization has led to several responses: privatization (at least as the first line of attack against inefficient state enterprises); market-determined prices (including exchange and interest rates) in lieu of official or administered prices; and promotion of free trade and free access (Mills 1989).

A policy paper on economic reforms set out the Government of Kenya (GoK)'s plan for 1996-1998 to separate the regulatory and commercial functions of its power sector, facilitate restructuring and promote private sector investment (GoK 1996). It was co-prepared with the WBG and IMF. The policy paper required the separation of generation, transmission and distribution, and for the reform of the Kenya Power and Lighting Company (KPLC, renamed as Kenya Power since 2011) and other power companies. It also required that International Competitive Bids (ICB) would be invited for investment by IPPs in the power generation sector (GoK 1996).

Consequently, the Electric Power Act of 1997 was passed. The GoK's primary function became policy formulation through the Ministry of Energy (MoE), and its regulatory authority was devolved to the Electricity Regulatory Board (ERB) established in 1998 which was reorganized as the Energy Regulatory Commission (ERC) in 2006. Unbundling is translated into a re-definition of the scope of KPLC's activities such that it now focuses only on the transmission, distribution, and retail of electricity, while the Kenya Electricity Generating Company (KenGen) was established in 1997 to take over the generation from KPLC.

In 2004, the GoK indicated the need to fully unbundle the transmission and distribution functions of KPLC. However, unbundling KPLC would have been challenging owing to its status as a publicly quoted company, thus it was later decided that a separate company wholly owned by the GoK and funded by the exchequer be created to construct future additional transmission lines. In 2008, the GoK registered the Kenya Electricity Transmission Company (KETRACO). And KPLC retained and continues to operate all previously existing transmission systems.

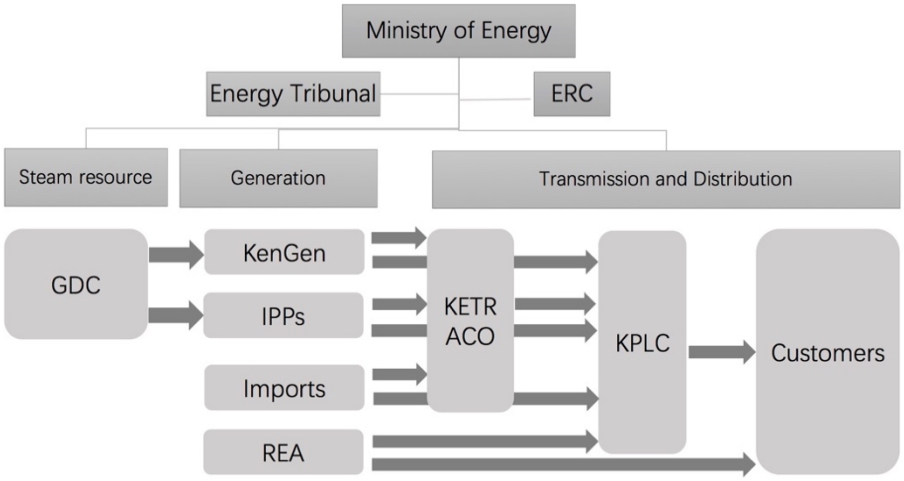

Figure 6.2 Structure of the electricity sector in Kenya.
Source: Adapted from SREP, 2011, Page 15.

Figure 6.2 outlines the electricity sector structure in Kenya with key actors. The other main institutions in the energy and electricity sector comprise the Energy Tribunal (ET, to hear and determine appeals brought against the decisions on energy), the Rural Electrification Authority (REA, to implement rural electrification projects on behalf of the GoK), the Geothermal Development Company (GDC, to develop steam fields to reduce upstream power development risks so as to promote development of geothermal electric power) (Kenya Power 2017).

Besides the unbundling which is affected by the global landscape, Kenya also adopted FiT policy since 2008, which is another global landscape that gained its momentum in this period aiming to adopt policy mechanism to accelerate the renewable energy investments. At the beginning, it covered the wind, small hydro and biomass sources. Without much interests from investors – only one project has been successfully developed under the policy, the Imenti Tea 0.3 MW small-hydro project, the FiT policy was reviewed in 2010, and started to cover geothermal, biogas and solar.

A number of renewable projects have been approved, for instance, the Kinangop Wind Farm with 60 MW, Kipeto Wind with 100 MW, Kwale Sugar Mill with 18 MW, and several small ones from 0.5 to 2.0 MW. Kinangop, Kenya's first FiT project, had been halted by 2015 due to local protest caused by land disputes (Eberhard et al. 2016). The Kipeto project authority also worried that the tariff for wind will most likely go down under the new FiT structure (CDM Executive Board 2012).

6.2.2 Dynamics from 1954 to 2016

Based on a literature survey, archival records, interviews with informants, three time periods are categorized in the energy transition history, in terms of the interaction features among landscape, regime, and niche novelties involving the ODF actors.

1) Nurturing niches in the context of stable state-owned regime (1954-1995)

This period featured the start of the preparation of geothermal projects with a transiting-yet-stable state regime, with the support from international communities in terms of technology and financial support.

In 1954, when Kenya was still in conflict with its British colonizers, the Kenya Power Company was formed to construct transmission lines, under the management of East Africa Power and Lighting Company (EAP&L). After withdrawing operations from Tanzania in 1964 when Kenya got its independence, it was renamed as Kenya Power and Lighting Company (KPLC) in 1983. Archival records released in the period of

1954-1972 indicate that since 1954 the then Commissioner at the Department of Mines and Geology (DMG) in Nairobi started to reach out the British Commonwealth Geological Liaison Office in London for technical assistance from Italy and New Zealand on the early investigation of geothermal energy in the Naivasha region. The British Balfour Beauty & Co launched the Great Rift Valley Geothermal Steam Project in 1956, and concluded that the steam did not satisfy drilling conditions in 1958.

From 1959 to 1962, DMG turned to Philippines, Mexico and US for sampling assistance. After independence in 1964, EAP&L conducted further surveys in 1966, and obtained technical and financial support from United States Agency for International Development (USAID) and United Nations Development Programme (UNDP) in 1967. In a document filed on April 19, 1967, the government refused to allow the private company, EAP&L, to have an exclusive prospecting license for geothermal steam, proposing that the Government of Kenya (GoK) lead the exploration so as to obtain substantial international assistance. In 1968, the Ministry Economic Planning and Development submitted the formal proposal prepared by EAP&L to UNDP for three million USD for a geothermal investigation project in Olkaria.

In 1982, the Geothermal Resources Act was enacted to vest the exploitation rights for geothermal in GoK. After decades of investigation, geothermal Olkaria I was launched as the first niche novelty of renewable energy in Kenya, with 30 MW in 1981, and another 30 MW in 1985. Competition was aimed at the Restrictive Trade Practices, Monopolies and Price Control Act in 1989, to reduce direct control of prices in the entire economy, including the electricity sector, as a prelude to the next stage.

2) Parallel expansion of regime and niches in a neo-liberal landscape context (1995-2010)

The second period starts with the landscape background of aid embargo by international donors in 1991-1994, for reasons of corruption and lack of advancement in the creation of a multi-party state. This landscape affected all sectors, including the geothermal projects. Besides the landscape of aid, Kenya, as with many other countries in and beyond Africa, started to be affected by the Structural Adjustment Programs (SAPs) proposed by World Bank Group (WBG) and International Monetary Fund (IMF) since the 1980s, with the essence of promoting neo-liberal reforms (Mills, 1989).

As a result of these landscape changes, a policy paper on economic reforms released by GoK in 1995 set out to separate the regulatory and commercial functions of its power sector, facilitate restructuring and promote private investment in 1996-1998 (GoK, 1996). It was co-prepared with WBG and IMF, requiring the separation of generation, transmission and distribution, and the reforms of KPLC (renamed as Kenya Power in 2011). It also required International Competitive Bids (ICB) to invite investment from Independent

Power Producers (IPPs) for generation (GoK, 1996). In 1995, tenders for the first two IPPs were released: one diesel (Tsavo), and the other one geothermal (OrPower4). In 1998, an OrPower4 Power Purchase Agreement (PPA) was signed for between 28 and 100 MW, and Tsavo PPA for 75 MW. In 2000, OrPower4 began to operate 9 MW with 4 MW added later.

The policy regime and niche were also affected by domestic landscape changes from 1993 to 2003 of: a) the depreciation of Kenyan Shilling, which weighted the project financial burden heavily on GoK, considering all Power Purchase Agreements are denominated in USD. The Kenyan Shilling against USD reached a historical record low of 36.23 in 1993, and was about 80 in 2003; b) severe drought in 1995/96, and 1998/2000, with four million people in need of food assistance in 2000 (of Kenya's total population of 31 million). Three emergency IPPs using diesel were introduced during the drought (Aggreko, Cummins and Deutz).

Consequently, the electricity regimes started to expand with reforms. The Electric Power Act of 1997 was set to review cost-effective electricity for rural areas, including policies to encourage the use of renewables, like solar and wind. The GoK's primary function became policy formulation through the Ministry of Energy (MoE), and its regulatory authority was devolved to the Electricity Regulatory Board (ERB) established in 1998 which later reformed to Energy Regulatory Commission (ERC) in 2006. Unbundling was translated into a re-definition of the scope of KPLC's activities such that it now focuses only on the transmission, distribution, and retail of electricity, while Kenya Electricity Generating Company (KenGen) was established in 1997 to take over generation from KPLC. In 2003, geothermal Olkaria II was launched with 70 MW, and extended another 35 MW in 2010 with the supportive policy on renewables.

In 2004, the GoK indicated the need to fully unbundle the transmission and distribution functions of KPLC. However, it would be challenging given its status as a publicly quoted company, thus it was later decided that a separate company owned by GoK and funded by the exchequer be created to construct future transmission lines. In 2008, the GoK registered the Kenya Electricity Transmission Company (KETRACO). And KPLC retained and continues to operate all previously existing transmission systems.

Other main actors in the sector comprise the Energy Tribunal (ET, to hear and determine appeals brought against the decisions of the energy), the Rural Electrification Authority (REA, to implement rural electrification projects on behalf of the GoK), the Geothermal Development Company (GDC, to develop steam fields to reduce upstream power development risks so as to promote development of geothermal electric power) (Kenya Power, 2017).

Kenya adopted a feed-in-tariff (FiT) policy since 2008, covering wind, small hydro and biomass sources. Without much interests from investors – only one project has been successfully developed under the policy, the Imenti Tea 0.3 MW small-hydro project, the FiT policy was reviewed in 2010, and expanded to cover geothermal, biogas and solar. A number of renewable projects have been approved, such as the Kinangop Wind Farm with 60 MW, Kipeto Wind with 100 MW, Kwale Sugar Mill with 18 MW, and several small ones from 0.5 to 2.0 MW. All these projects do not involve a specific payment security instrument, such as a Letter of Credit (LoC) from KPLC, instead, they have a letter of support from GoK which is not a guarantee.

Figure 6.3 presents electricity production by sources in Kenya from 1992-2016. The period of 1995-2016 is featured by parallel expansion of regime and niche novelties: renewables, mostly geothermal, are steadily increasing from 13 to 48 percent.

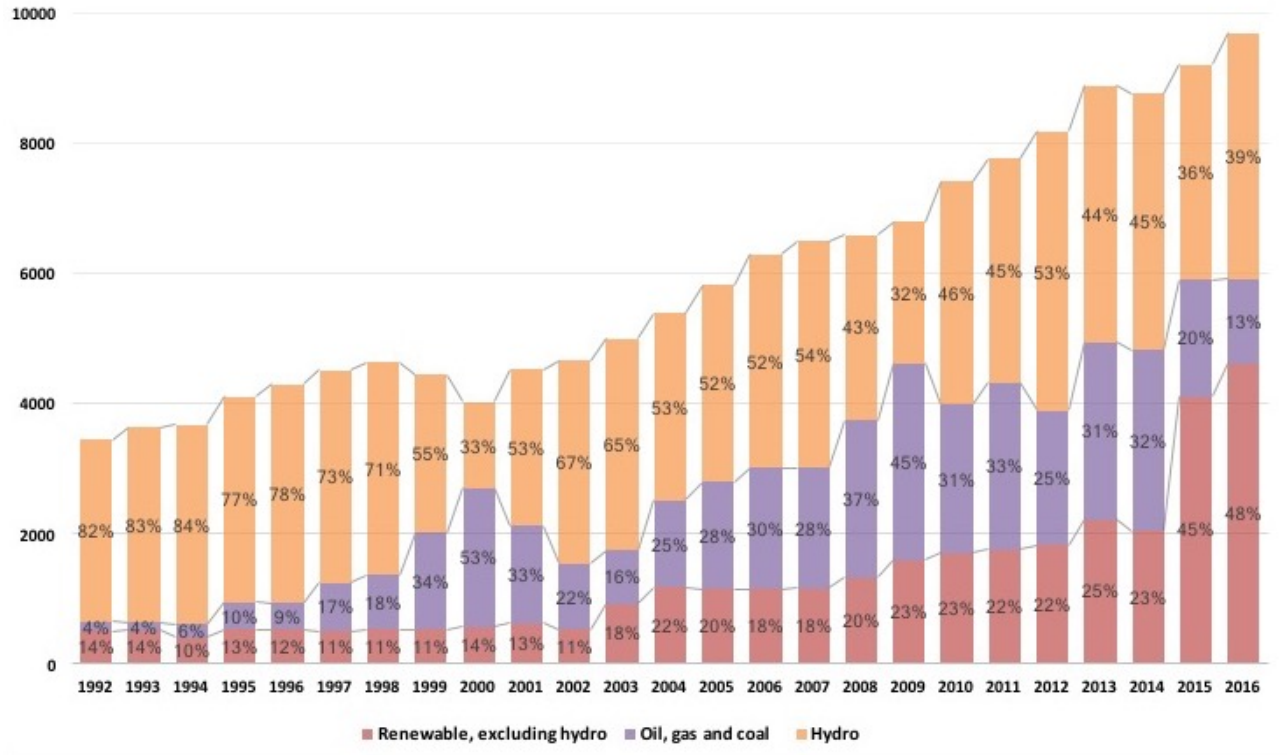

Figure 6.3 Electricity production by sources in Kenya from 1992-2016, unit in GWh

Note: given the data availability, the 2014-2016 data is electricity purchased, thus actual production might be different.

Source: Author compilation based on World Bank database (1992-2013) and Kenya Power annual reports (2014-2016).

3) Increasing renewables in the changing socio-political landscape context (2010-2016)

Sharp growth of renewable energy in the electricity production from 2010 to 2016 became apparent, though with a slight decrease in 2014. The latest data in 2016 found that geothermal had contributed to 48

percent of Kenya's electricity generation, with the rest from hydro (39 percent), thermal (12 percent) and wind (1 percent) (KenGen, 2016). This accrues from the new operation of previous geothermal projects, such as Olkaria IV project with 140 MW in 2012, and OrPower4 project with 36 MW in 2013, 26 MW in 2014 and another 29 MW in 2016.

In recent years there have been various changes in Kenya's socio-political landscape. The newly established Constitution in 2010 divides Kenya into 47 counties, to which both political power and government functions are devolved. As the most far reaching institutional and public finance reform undertaken in Kenya to date (Ndii, 2010), it requires adequate adjustments in the policy regime of the energy sector. Under the Constitution, the functions of energy policy including electricity and gas reticulation and energy regulation have been assigned to the national government, while planning and development, including electricity and gas reticulation and energy regulation, are assigned to the county governments. In comparison with the national government, the county governments obtain less capacity on technology, financial and human resources to plan and develop the renewable electricity projects, which may destabilize the regime.

Besides the domestic landscape change, the international landscape on climate change also affected the national landscape, resulting in relevant changes in energy policy regime. 2010 witnessed the establishment of a National Climate Change Response Strategy, the first of this kind to addressing the climate change threats as well as the opportunities that may arise. The National Climate Change Action Plan 2013-2017 in 2012 called for increasing the reliability of the electricity supply by reducing reliance on hydropower. The Kenya National Adaptation Plan 2015-2030 released in 2016 demonstrated Kenya's commitment to the Paris Agreement, and aimed to increase the solar, wind and other renewable systems network to provide power to off-grid areas.

The energy policy regime also experienced internal reform. Since 2014 the GoK has been intending to replace the failed FiT policy. Kinangop, the first FiT project, was halted by 2015 due to local protest caused by land disputes (Eberhard et al., 2016). The Kipeto project authority also worried that the tariff for wind will most likely go down under the new FiT (CDM Executive Board, 2012). As MoE identified as one of the key challenges regarding the FiT policy – "insufficient data and analytical tools to inform the tariffs level" (KMEP, 2016). GoK decides to move to an auction system to promote renewable generation, with the aim to reduce electricity costs for consumers. The new auction regulation to be issued in 2017 is believed to mostly favor the solar sector and it is not clear how it would affect private geothermal energy development, and in

particular on-going projects (Richter, 2016).

The policy regime also saw the enactment of Energy Bill in 2015, and National Energy Policy in 2016 which calls for the establishment of two high-level agencies – the inter-ministerial Renewable Energy Resources Advisory Committee (RERAC), and National Electrification and Renewable Energy Authority (NERA) as the lead agency for development of renewable other than geothermal and large hydro.

As a result of the above landscape and regime changes, by June 2016, eleven IPPs had accounted for about 30 percent of the installed capacity in Kenya, or 691 MW in total, which grew considerably compared with the 12 percent in 2005 (KPLC, 2016). KenGen still remains the largest power producer in Kenya. With an installed capacity of 1,630 MW KenGen commands a market share of 69 percent, and generated 80 percent of national energy consumption (KenGen, 2016). In 2016 KenGen had a contract to drill two commercial wells for Akiira Geothermal Project in Olkaria region. Continuous growth of renewable energy novelties can be expected in future, given that the GoK encourages continuous investment in geothermal to achieve 5,500 MW by 2030, and the operation of the Lake Turkana Wind Project with 310 MW of capacity ready in 2017.

6.3 Role of exogenous actors in energy transition

This section further examines the role of international donor actors in promoting the development of renewable electricity in Kenya, by examining three existing niche novelties employing the renewable energy to generate electricity, and the role constellation with an example of the World Bank.

6.3.1 Three niche novelties and interaction with regimes

Three existing niche novelties, two on geothermal and one on wind, are selected to explore the actors and their fitness with regimes (Table 6.2). They are chosen because: the OrPower4 geothermal project is the first operating renewable energy Independent Power Producer (IPP) in Kenya; the Akiira geothermal project is the on-going first private sector greenfield geothermal IPP in Kenya and Africa; and the Lake Turkana Wind Project is the largest single wind power project in Africa.

Two key findings are observed in terms of the niche actors' relations with regimes: 1) Two of the only existing geothermal novelties in Kenya's electricity sector revealed that they are treated divergently by the same actors, indicating a lack of institutionalized incentives on geothermal electricity; 2) The wind power is paid less attention in the current energy regime, in comparison with geothermal power.

Whilst GoK has established considerable institutional support for geothermal exploration to create protective spaces, and international actors have provided financial and technological support, OrPower4 obtained more policy support than Akiira. Though both novelties got PPA signed with KPLC, OrPower4, probably because it is the first IPP in Kenya, received more protective space in terms of geothermal well donations from KenGen, and more financial support and financing confidence from international financiers.

Table 6.2 Three niche novelties, actors, and fitness with regimes in Kenya

Project	Technology	Actors involved	Fitness with regimes
OrPower4 Geothermal Project, since 1998, 140 MW in operation	Lower cost (0.10 USc/kWh) than similar projects (0.14 USc/kWh in Olkaria II by KenGen) in 2015.	Ormat, a US company; Finance from US (OPIC) and EU (DEG, KFW, and co-lenders); Risk insurance from MIGA; Drilling from KenGen and itself.	First renewable IPP after the policy on International Competitive Bids (ICB) for electricity generation in 1995, yet only two bids with the other as non-compliant; KPLC signed PPA of 20 years; KenGen donated 8 MW worthy of 24 million USD in 1998.
Akiira Geothermal Project, since 2015, in process, 70 MW proposed	Tariff negotiated under PPA remains unknown.	Kenya Centum Investment Company and three other non-Kenyan companies; Finance from US (OPIC, USTDA), African Union, and commercial banks; Risk insurance from Munich RE; Drilling from KenGen and China.	Quasi national background contributed to its successful application as IPP in 2009; GoK promoting renewables; GoK pending its application of using pension fund; Failed drilling by KenGen; KPLC signed PPA.
Lake Turkana Wind Project, since 2014, 310 MW expected in 2017	Tariff negotiated under PPA: a base rate of 7.52 EUc/kWh for up to 1,684 GWh and 3.76 EUc/kWh for additional.	Lake Turkana Wind Power including various entities from Netherlands, UK and Nordic countries; Finance from EU, AfDB, US and commercial banks.	Initiated as an unsolicited bid directly with MoE; GoK promoting renewables; KPLC signed PPA of 20 years.

Source: Author compilation based on the information of each project.

The Orpower4 Geothermal Project generated power at a lower cost (0.10 USc/kWh) than similar projects (0.14 USc/kWh in Olkaria II by KenGen) in 2015 (Eberhard et al. 2016). The successful operation demonstrates that a combination of national government support, in the form of early-stage exploration and donation on wells from KenGen, a PPA package to guarantee the power off-taker can pay the agreed tariff,

international public finance with longer terms and lower costs than locally available, and Political Risk Insurance from MIGA (Micale et al., 2015).

On the contrary, Akiira Geothermal Project faces more challenges. Akiira Geothermal Limited (AGL) is a special purpose vehicle by one consortium owned by the Centum Investment Company Limited (CICL) of Kenya and three other non-Kenyan companies. The interview with Akiira staff reveals that the previous history of CICL as a state-owned company contributed to the successful application as an IPP in 2009. However, the initial test drillings conducted by KenGen failed. The financing process is not smooth either, for instance, the application of using Kenyan Pension Funds is still pending. The Akiira project receives commercial insurance for failed geothermal drilling by Munich RE, rather than the one from the World Bank's MIGA. It secured the financial support from African Union Commission, and US Overseas Private Investment Corporation (OPIC) and US Trade and Development Agency (USTDA), unlike OrPower4 which mobilized additional finance from European debt providers, such as German Investment Corporation (DEG), KfW Development Bank (KFW), and other European co-lenders.

In comparison with the two geothermal projects, the Lake Turkana Wind Project suggests that currently Kenya lacks effective policy regimes to encourage the adoption of wind power. For instance, the energy regime requires ICB for electricity generation projects. OrPower4 has one competitor who turned out to be non-compliant in the end. Akiira got the IPP position with its quasi national background. However, LTWP was initiated as an unsolicited bid directly with the Ministry of Energy.

The reason why LTWP can quickly become adopted and operational within three years probably lie in the fact that the incumbent utilities in Kenya pose less pressure. Wind power in 2016 only contributed to one percent in Kenya's electricity generation, putting less competition on LTWP compared with KenGen to Akiira. Though Kenya does not have abundant domestic knowledge on wind power as much as on geothermal accumulated from decades of learning, the international entities comprising LTWP could bring in wind technology directly for the sustainability transition in Kenya. The diverse entity composition of LTWP also enables substantial financial support from international donors and commercial banks.

6.3.2 Role of international actors

As regards financiers for geothermal and other renewable in Africa, as UNEP (UNEP FI 2012) pointed out, given that the pronounced regulatory and macroeconomic risks in Africa always bring in high return expectations of private investors, for now, geothermal finance can only be effectively provided by

international donors. During the last decade the multilateral and bilateral development banks, in the type of ODF, have been among the largest and most active investors in renewables in the developing world (KfW, 2005). This also proves to be the case for Kenya. As illustrated in the previous section, international actors are actively involved in the renewable energy niche novelties in Kenya.

International actors not only engage at the niche level, they also provide interventions at the regime level in Kenya, especially by the World Bank. Many analysts believe the energy sector reform in Kenya is largely donor-driven, with limited local input at the conceptual and implementation level (Turkson, 2000).

Before and through the 1990s, the World Bank was the prime financing agency for Kenya's electricity sector, and it has been instrumental in mobilizing finance from other bilateral development agencies and banks. For instance, IDA provided loans and credits totaling 212.2 million USD for Kenya's power investment from 1971 to 1988. The 1995 Policy Framework Paper and the 1997 Electric Power Act were both enacted right after the aid embargo from 1991-1994, and both were strongly supported by the World Bank. After unbundling generation sector in 1997, IPPs were invited to join the bids for generation. MIGA issued a guarantee of 88.3 million USD to Ormat for its 98.1 million USD equity investment in the OrPower4 geothermal project, covering for up to 15 years against the risks of war and civil disturbance, transfer restriction, and expropriation in Kenya.

The financial and technological support from international actors at both niche and regime levels have contributed to the sharp growth of geothermal in Kenya. By 2016, geothermal has become the dominant electricity source in Kenya, with 48 percent (Figure 6.3). However, a deeper looker at the installed generation capacity by ownership revealed the gap between incumbent and new entrants (Figure 6.4), suggesting that international actors can further unleash the potential of IPPs in developing renewable electricity sources.

Comparing the years of 2005 and 2016, KenGen's geothermal capacity increased from 10 to 21 percent, while IPPs grew from 1 to 6 percent. Therefore, protective policies should put more weight onto the IPPs' geothermal development, given that the incumbent KenGen has already gained technological expertise, as well as committed institutional and financial support from GoK and international financiers with long-term cooperative relationships.

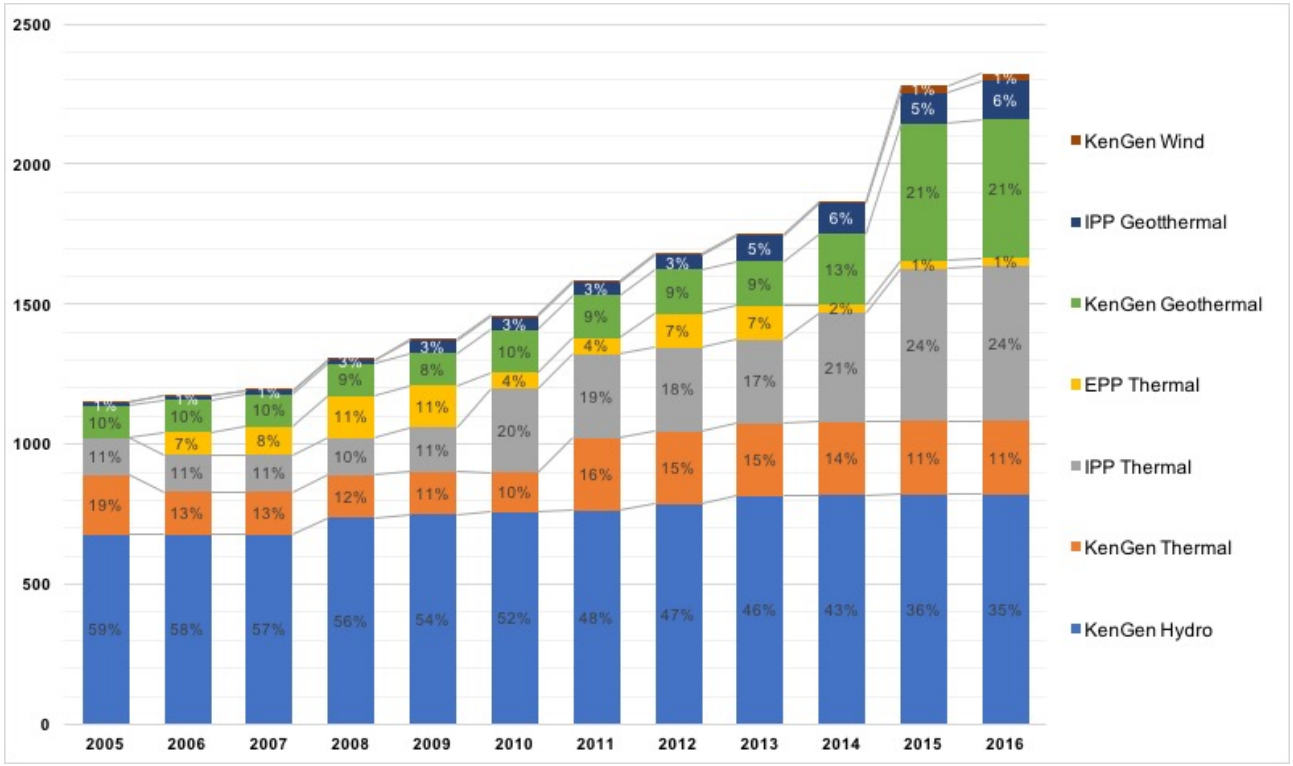

Figure 6.4 Electricity generation capacity by ownership in Kenya from 2005-2016, unit in MW

Note: Percentage less than 1 percent is not indicated. EPP stands for Emergency Power Producer.

Source: author compilation based on annual reports of KPLC and ERC.

Adopting the five dimensions of taking effective protective policy measures (Boon & Bakker, 2016), the geothermal institution regimes in Kenya could work on: a) width by covering different geothermal generation methods, such as dry steam power plants, flash steam power plants, binary cycle power plants and lately wellhead generator units; b) depth by offering insurance covering not only the failed test drilling, but also other failures in operations; c) duration by extending the period of PPA; d) tools by periodically examining the functions of current incentives like FiTs and renewable auction; e) legitimization by reviewing the assumptions and feasibilities of unbundling the generation, transmission and distribution.

Considering the fierce competition in the game among Kenyan actors, such as KenGen and IPPs, the international actors may be regarded as influential exogenous impetus, as they already did in the past. To tackle the financial constraints for IPPs on geothermal and other renewables in and beyond Kenya, based on the interviews, the international financiers could work on: a) width by financing different applications on the technology; b) depth by financing with less criteria to be fulfilled; c) duration by lengthening the grace period, and payment period; d) tools by providing various kinds of financial support, such as grants, export

credits, concessional loans, and commercial loans, and making use of refinancing to reduce the borrowers' burden; e) legitimization by re-examine the international financing guidance against the needs in Africa.

The Public Private Partnership (PPP) Act enacted in 2013 could also help Kenya derive greater financial value from both public and private actors domestically and internationally through better project preparation, better risk allocation, increased transparency, and greater efficiency (SLS Group, 2013). Kenya has attracted much support on geothermal and wind development from multilateral development banks, bilateral development agencies, special purpose finance (Ngugi, 2012). Nonetheless, this financial support can be further mobilized, or balanced with private investment in this domain, by strategic actor engagement, especially for the IPPs, to help Kenya increase its electrification rate from renewables.

6.4 Summary

Studying the past energy transition is critical for the promotion of renewable electricity, especially for the Sub-Saharan African countries whose electrification rate is the lowest in the world, 35 percent in average, and where renewables have a profound role to play in achieving the Sustainable Development Goals (SDGs).

The multi-level perspective is adopted to analyze the niche-regime-landscape dynamics in Kenya's electricity sector from 1954 to 2016, with three stages: Nurturing niches in a context of stable state-owned regime (1954-1995); Parallel expansion of regime and niches in a neo-liberal landscape context (1995-2010); Increasing renewables in a changing socio-political landscape context (2010-2016). The finding is that the role of exogenous actors is important in changing the landscape and regimes, and building up the niche novelties on renewable energy. Interactions of three renewable novelties are further analyzed, revealing the important role of exogenous actors in providing more protective spaces in geothermal and wind power novelties for future transition. Therefore, it proves that the donors motivate the renewable energy regime's transition through intervention at both niche and regime level and role constellation with recipient actors.

To gain lessons for future engagement with endogenous and exogenous actors in developing countries for sustainability transition, the paper suggests that developing countries could increase negotiation skills while engaging with exogenous donor actors in the renewable energy financing and technology transfer process, and enhancing their ownership in mobilizing both local private finance and international public finance towards the sustainability transition.

Chapter 7 Discussion

The previous three chapters through three case studies analyzed the role of Chinese and traditional Official Development Finance (ODF) actors and their interactions in Kenya's infra-system transition towards sustainability. This chapter first, in Section 7.1, summarizes the key finding of each case study, and answers the research question respectively; second, in Section 7.2 draws implications for the two fields of studies – the ODF and Sustainability Transition (ST) – as the contribution of this research.

7.1 ODF for infra-system transition towards sustainability in Kenya

This research asks the research question "***how can ODF, from both traditional and emerging donors, at the niche level affect the rules and institutions at the regime level for the infra-system's sustainability transition in Kenya?***" Developed on the actor and role change of transition theories, the hypothesis is that "***it is only when donor actors change their single roles and play role constellation among donor and recipient actors with sustainability perspective that their niche projects motivate sustainability transition of recipient's infra-system regime. Focusing on either role change or role constellation, not to mention the sustainability perspective is not enough for donors to design their ODF towards the goal***". The results from three cases in Kenya suggest that the hypothesis holds true: ODF donors motivate the sustainability transition of infra-systems in Kenya by changing their roles quantitatively and qualitatively with sustainability considerations, and by active role constellation at niche and regime levels among donors and recipient actors.

7.1.1 Role change of Chinese ODF actors

The Lamu Port case was chosen to examine: China motivates or hinders the Kenyan infra-system regimes by changing its single role quantitatively or qualitatively concerning the sustainability issues of the projects. If the role is changing towards sustainable transition, either by itself or through role constellation, it motivates the transition. The case demonstrated the role of Chinese government and financial institutions still lack qualitative changes towards sustainable management of the ESRs as might be induced from Chinese ODF projects, though quantitative changes are observed. Therefore, the Chinese ODF projects may hinder the transition of transport regime towards sustainability.

Interviews showed that the Chinese actors have to a large extent changed their roles in considering and

mitigating the ESRs within the Lamu Port project and in other transportation projects. However, the extent varies by actors. Chinese companies have changed their roles quantitatively, or even qualitatively. Though still regarding itself as contractor, the Chinese company in the case study has taken the ESR mitigation measures required by the contractor. The roles of Chinese government and financial institutions have also changed quantitatively with the issue of several voluntary regulations, yet without much qualitative change, still lack establishment of mandatory legislation and institutions.

7.1.2 Role constellation of traditional and Chinese ODF actors

The Olkaria I and IV geothermal project was selected to examine: the traditional and Chinese donors motivate or hinder the transition of Kenya's infra-system regimes. If the constellation is in line with sustainable transition, they motivate the sustainability transition. If not, they hinder.

The study found that the current role constellation is rather limited between traditional and Chinese donors in geothermal projects, and the lack of aid coordination led to several sustainability issues, such as the increase of transaction costs, and ignorance of ESRs in the project. Therefore, the donors as a group may hinder the transition if they do not have active role interplay and role change towards aid coordination.

Reasons for the limited role constellation are multi-faceted: 1) the Chinese actors have low interests in joining the traditional donors' aid coordination, and they lack a formularized ODF executing agency to represent their core interest in the negotiation; 2) the traditional donors' current coordination is loose and nonfunctional as expected, and they are not fully ready to engage with the emerging donors including China; 3) GoK could exploit maximum benefits from the competition between traditional donors and China through leveraging negotiation capitals with these donors.

7.1.3 Role constellation of international ODF and Kenyan actors

The historical review of renewable energy transition in Kenya aimed to test: international donors motivate or hinder the recipient' renewable transition. If the role constellation is in line with sustainable transition, they motivate the transition. If without sustainability perspective, they hinder.

The examination revealed that the international ODF donor actors have played a critical role in the energy regime's transition. The niche novelties by international donors and companies, and the regime level interventions with the Kenyan energy sector actors led by the World Bank, have helped to boost the exploration of geothermal for electricity generation, which therefore contributed to sustainability transition.

Meanwhile, the study of three existing niche novelties suggested that international ODF could better contribute to the development of Independent Power Producers (IPPs) with the usage of renewable energy, particularly the wind power which is currently paid less attention in the regime in comparison with the geothermal power.

7.2 Implications for ODF and sustainability transition

While examining the role of ODF for the infra-system's sustainable development in the developing countries, the sustainability transition theories provide a bigger context going beyond one single project, and could help guide the role change of donor actors, and their role constellation with recipient actors with the common goal of sustainability transition.

In the meantime, the actor theory in the sustainability transition theories is refined and expanded by including the donor actors' intervention, as an important factor especially for the developing countries' transition, and by disaggregating the donor actors with both traditional and emerging donors.

This section discussed three implications for ODF, including Chinese ODF, traditional ODF, and ODF evaluation by recipient countries, and another three implications for the sustainability transition field, including the comparison of developing and developed countries in the infra-system transition, donor actors' role constellation, and recipient actors' role constellation towards sustainability transition. Lastly, it discusses the ODF as an intervention at niche and regime levels for sustainability transition.

7.2.1 Sustainability of Chinese ODF

Unlike most of the DAC donor countries, China provides most of its ODF on infra-system construction, which is believed to be able to improve the mobility and boost the economy growth in the recipients. Therefore, financing infra-system could help facilitate the transition, however, the sustainability transition requires the financing to be sustainable as well.

The Lamu Port case demonstrated that there is a vacuum in the current environmental and social mitigation and safeguards framework. In recent years, the Chinese government issued several guidelines to encourage the Chinese banks to provide green finance, and advised the Chinese companies to shoulder environmental and social responsibilities in overseas investment. And the improvement of the Chinese companies in Kenyan cases is observable on their awareness and project management. However, in comparison with traditional donors, the Chinese actors still lacks a coordination and monitoring mechanism.

In terms of organizational structure, there has been debate on upgrading the current Department of Foreign Assistance, Ministry of Commerce, to a ministerial level entity specifically in charge of the Chinese ODF overseas. In terms of regulations and legislation, the first state-level law on overseas investment is being drafted currently to assemble the existing cross-ministerial-guidelines, led by the Chinese Ministry of Commerce, and National Development and Reform Commission (NDRC) (Xinhua 2017).

Given that the current Chinese organization and regulation vacuum may potentially undermine the environment and social rights in the ODF funded projects, the proposed coordination mechanism in this research may help create a configuration for role constellation between Chinese actors and Kenyan actors.

7.2.2 Transition of traditional ODF

Traditional donors in the decades of ODF provision have formulated relevant organizations and regulations to monitor the sustainability of their ODF, especially in terms of environmental and social considerations in their ODF projects. However, whether this ODF could fundamentally promote the transition is debatable.

Lin & Wang (2017) in the book *Going Beyond Aid* claimed that "traditional aid is in effective for structural transformation" because it could not alleviate infrastructure bottlenecks. Meanwhile, they found that 63 percent of Chinese ODF financed infra-system projects, 168 projects in total from 2001 to 2010, have matched African's need for infra-system transformation.

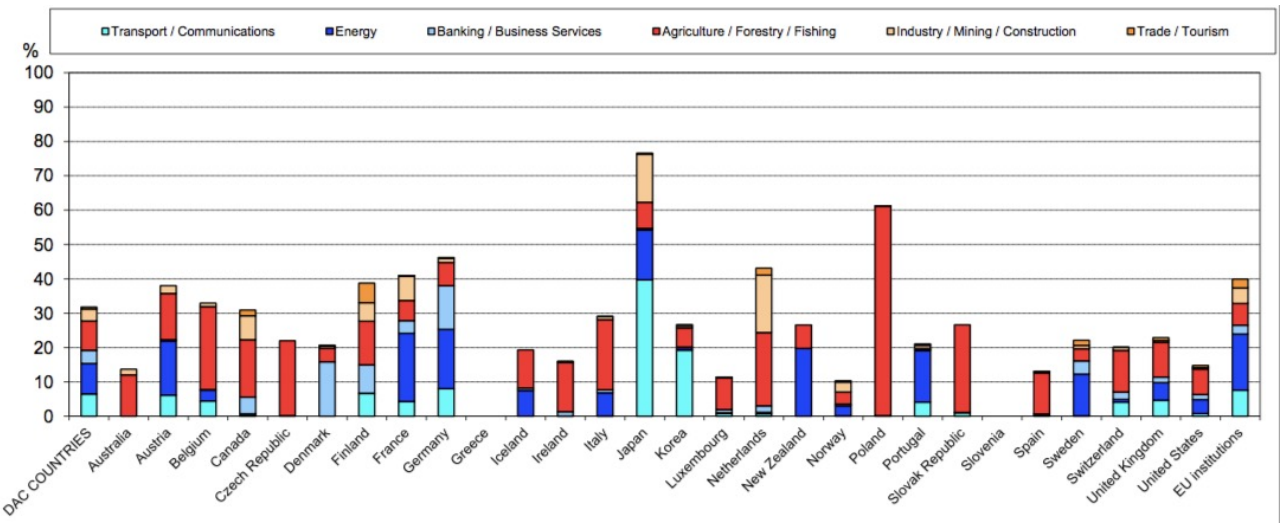

Figure 7.1 Analysis of economic and production sector ODA to Africa by donor
as a percentage of total sector-allocable commitments for each donor in 2015.
Source: OECD, 2017b, Page 14, Figure 2.3.6.

In 2005 the DAC donors launched the Aid for Trade initiative and started to pay attention to financing the economical infra-system development. In terms of percentage of total sector-allocable commitments for each DAC donor in 2015 (Figure 7.1), Japan and Korea provided most of their ODA to transport and communication sectors. In terms of both transport and communication and energy sectors, Japan ranked top, followed by Germany and France.

Emphasizing the necessity of financing infra-system does not ignore the importance of other sectors, such as education, health, and governance social sectors. Africa, the "Hopeless Continent" as labeled by *the Economist* in 2000, has been growing rapidly in the last decade, and is poised to transform itself for economic prosperity and sustainable development. In the First Ten-Year Implementation Plan (2014-2023) towards the vision of African Agenda 2063, infrastructural development is regarded as one of the focus areas. The road access rate in Africa is only 34 percent, compared with 50 percent in other parts of the developing world, while transport costs are 100 percent higher. Only 30 percent of Africa's population has access to electricity, compared to 70-90 percent in other parts of the developing world (PIDA 2010).

To bridge the infrastructure gap and transform its infra-systems in Africa, the Programme for Infrastructure Development in Africa (PIDA) was formulated in 2010 by the African Union Commission (AUC), in partnership with the United Nations Economic Commission for Africa (UNECA), African Development Bank (AfDB) and the New Partnership for Africa's Development (NEPAD) Planning and Coordinating Agency (PIDA 2012).

The 51 projects recognized in the PIDA Priority Action Plan spread across four sectors of energy, transport, information and communication technology (ICT) and trans-boundary water. The total estimated cost of all the 51 projects by 2040 is USD 360 billion. By 2020, the energy and transport sectors will require around 97 percent of the total cost of USD 67.9 billion, with energy sector at USD 40.3 billion and transport USD 25.4 billion, demonstrating the critical need for transformative investments in these sectors to support trade, promote economic growth, and create jobs. Investment needs for water (USD 1.7 billion) and ICT (USD 0.5 billion) represent lower percentages because the basic infrastructure network is largely in place.

A recent report by World Bank (2017) revealed that closing the infrastructure gap relative to the best performers in the world could help increase growth of GDP per capita in Africa by 1.7 percent per year. However, public capital spending from African countries is estimated at 2 percent of GDP annually between 2009 and 2015, with 70 percent for transportation, and 15 percent respectively for electricity and water. PIDA estimates that domestic sources will only meet 50 percent of the cost by 2020, with the share growing

to 66 percent by 2030 and to 75 percent by 2040.

The share of overall capital budget allocations in Africa funded through external ODF registered 36 percent in 2015. Therefore, international ODF will continue to play an important role in the infra-system transition of African countries.

However, it remains to be explored in terms of whether the traditional donors have the incentives or comparative advantages to finance the infra-system transition in Africa. Japan and South Korea gained the lessons that financing the infra-system could help unleash the economic growth potential in their own development, and hence embedded this principle into their ODF to developing countries. While the European countries, especially the Nordic countries, regard it as moral hazard to gain economic profits in the delivery of ODF to developing countries in the past and current debates. China, on one hand, holds it as a lesson learnt from its own development as Japan and South Korea; on the other hand, believes win-win exist if the other developing countries raise the request of helping on transiting their infra-system. Therefore, requiring the traditional donors to largely finance on infra-system would require a large shift in their ODF principles, which may not happen as desired or it is not desired at all.

7.2.3 ODF evaluation by the recipient countries

Traditional donors have established organizations and regulations to monitor and evaluate their ODF funded projects in a recipient country, such as on environmental and social risks mitigation and aid coordination with other DAC donors, and they also evaluate their entire ODF to all the recipients. The Chinese donor actors lack of such kind of organizations or mandatory regulations to provide rigorous monitoring or evaluation, and at present mainly depend on the actors' self-willingness. From the aspect of recipients, it is hard to find effective and efficient measures to monitor and evaluate the donors' projects by recipients.

Without such kind of monitoring and evaluation from the recipients' perspective, environmental and social risks are still observed in the Olkaria I and IV geothermal project, even though all the traditional donors applied their ESR mitigation mechanisms. Therefore, regular project-level evaluation from the recipients' perspective could help monitor and guide the international ODF projects.

Besides project-level evaluation, the country-level evaluation of the international ODF projects comprehensively in main domains, such as transportation and energy sectors, could help the recipients clearly understand whether the accumulated ODF efforts have contributed to the country's sustainability transition, and diagnose problems for future transition. As Chapter 6 showed, the multi-level perspective

analysis enabled an overview of international finance in Kenya's renewable energy transition and allowed us to identify obstacles.

Therefore, the concept of "ownership" should go beyond self-designing and self-implementing the ODF projects, or obtaining some portion of the ODF for general budgets. It should also encourage recipients to evaluate the effectiveness of international ODF at project, sectoral and country levels.

DAC donors have had discussions on recipient-country-led evaluation, and summarized five opposing elements: 1) evaluation is partially supply-driven, as is the case of the Poverty Reduction Strategy Papers (PRSPs); 2) evaluation is more on monitoring, rather than as an instrument of learning; 3) the perceived risk that independent evaluation of ODF may result in political and financial consequences, hence the recipients depending heavily on ODF may be reluctant to evaluate the role of donors independently; 4) donors' support is not fully integrated into the policy cycles or the interactions between donors and recipients actors; 5) starting up a process towards a country-led evaluation may require much more time than expected, because of the necessary internal negotiations between ministries, actors, evaluators and so on (DAC 2003).

ODF is not all about geo-political issues, but geo-political complexity cannot be avoided in ODF studies. It seems a recipient country-led evaluation may face several realistic challenges. Nonetheless, independent researchers could use the sustainability transition theories to conduct the empirical study of the role of international ODF in the recipients' infra-system transitions from project, sectoral and country levels.

7.2.4 Developing countries' infra-system transition: in comparison with developed world

The Kenyan case, in comparison with developed countries, revealed less interaction between niche novelties and social networks, and more complicated actors influencing the regimes, featuring communities vulnerable to environmental and social changes, and international donors with their own geo-political priorities. This indicates that in the sustainability transition field of research, further attention shall be paid to these aspects.

Less interplay between niche novelties and social networks, such as the community and NGOs, is mainly because of lower community awareness and lack of communication channels with the government agencies. Though the Lamu civil societies organized meetings and submitted their protest letters to the central government, the project process has not been largely affected. Though the renewable electricity novelties in Kenya experienced some protests from local residents at the primary state, the interaction between niche and social networks in Kenya generally did not prevent the three projects from launching or becoming operational. Developed countries may face another consequence, for instance, nuclear power in

Germany faced great pressure in 1998-2009 due to a Red-Green coalition. The UK also experienced problems with regard to local implementation, because utilities and project developers engaged in poor consultation processes which gave rise to public opposition.

The niche development is also associated with the cognitive institutions within socio-cultural regime, and users, markets and distribution networks. The social awareness of the side effects of renewable energies in Kenya remains lower than in developed countries, which may contribute to quicker and smoother adoption of renewables in developing countries without much "trouble" from protests. However, it comes at the expense of the local residents facing all the pros and cons, such as the release of toxic gas in the Olkaria geothermal projects, and the possible loss or change of their livelihoods in the Lamu Port project.

Given that Kenya's infra-system transition needs the support from international donor actors, Kenya has to deal with the complexity of donor actors, and their requirements so as to obtain the needed ODF.

Taking the gaming on unbundling reform among the World Bank, GoK and vested interest groups for instance, in the drafting process of 2016 National Energy Policy, GoK balked at the thought of unbundling the transmission and distribution sectors, which would definitely dampen the investors' interest and confidence in investing in Kenya's electricity sector. For example, the 2012 draft version stated: "*to provide a framework for open access to transmission and distribution networks, and to provide that transmission to be at national level while generation and distribution to be at both national and county levels*", indicating the intention of vertical unbundling of the transmission and distribution sectors, as well as horizontal unbundling of the generation and distribution between the national and county governments levels.

However, the 2016 final version chose a conservative attitude: "*to facilitate open access to the transmission and distribution network while safeguarding the existing obligations and commitments*", "*with liberalization of the energy sector careful implementation of an open access system in transmission should be given due consideration to safeguard the existing obligations*", and "*the devolved structure in the energy sector calls for careful implementation of an open access system in distribution*". Thus, the unbundling in Kenya seems to be remaining only in the generation sector in the short term.

Pineau (2007) pointed out that the World Bank had a poor understanding of the problems in Cameroon and other African countries, adopting the pre-determined solutions (namely, promote private foreign investment), and there were several shortcomings in assessing the impacts. The interview with IDA energy specialists suggested that the World Bank is undertaking a review to rethink the decades' electricity sector reform advanced by World Bank, including the unbundling, and has come to believe that the reform should

be led by the national government, supplemented by market engagement.

Alongside the strong belief and push by World Bank on electricity sector reform, the institutions and their operations are also critical to the problem analyzed. The Independent Evaluation Group of World Bank in its report (World Bank 2013) stressed the importance of working as one group, and stated several conflicts of interest among the group members: IDA, MIGA, PPIAF and IFC. For instance, the regulatory advice by IDA and PPIAF may be compromised in order to support MIGA guarantees and IFC investments. A MIGA senior staff on Public Private Partnership (PPP) in the interview also admits that there is always room to improve the WBG institutions to promote the renewable PPP in developing countries.

After decades of practice facilitated by World Bank, it seems reasonable to review the outcomes of electricity sector reform worldwide, to have some urgent adjustments and fine-tuning. Meanwhile, judging from the fact that only 23 percent of Kenyan population can access to electricity, it is also understandable why the GoK decides to keep the transmission and distribution sectors bundled for the time being. It requires future study on the extent to which the unbundling can be promoted in Kenya, and the extent to which the recipients who know themselves best follow policy advice from international donor actors.

7.2.5 Donor actors' role constellation towards sustainability transition

The Lamu Port case and the Olkaria I and IV geothermal case suggested that the Chinese single role could be further changed with more enhanced role constellation with traditional donors. It remains unclear whether Chinese donor actors would adopt the DAC donors' models to address the ESR and coordination issues, or China would explore the Chinese approaches. What is clear is that China could find solutions through intensified interaction with traditional donors and recipient countries.

Some scholars have applied game theory to analyze the challenges for aid coordination among multi-donors (Bourguignon & Platteau 2015), and the negotiating capitals and strategies of African governments in receiving international ODF (Whitfield & Fraser 2010). The relation of traditional and emerging donors in international development finance arena is not a zero-sum game, and can be a cooperative game with some conditions. For instance, Chinese actors adjust themselves to DAC policies to some extent on transparency, untied aid and environmental and social safeguard policies. Alternatively, traditional and emerging donors through role constellation form new configurations.

The proposed coordination mechanism addressing the ESR issue, and the proposed Germany-China-Kenya trilateral cooperation mechanism addressing the geothermal drilling finance, are such

kind of attempts for a workable and effective configuration among traditional and Chinese donors as well as recipient countries.

Beside the evolving North-South Cooperation, recent decades have also seen increasing collaboration between emerging donors under the auspices of South-South Cooperation. Vazquez et al. (2016) claimed that the South-South countries follow general principles that reflect different standards of effectiveness. In Brazil, China and India, the selection of development cooperation modalities is based on requests by partner countries and the extent to which they meet their own foreign and economic policy priorities, for instance, China's aid has been closely articulated with the new "Belt and Road Initiative".

The New Development Bank (NDB), formerly referred to as the BRICS Development Bank, is a multilateral development bank established by the BRICS states (Brazil, Russia, India, China and South Africa). The aim is to mobilize resources for infrastructure and sustainable development projects in BRICS and other developing countries. In 2016, the NDB approved over USD 1.5 billion loans for projects in the renewable energy and transportation sectors, which marked the intensifying interaction among the emerging donors in providing ODF for infra-system's sustainability transitions in the developing world.

7.2.6 Recipient actors' role constellation towards sustainability transition

In addition to engaging with the international donor actors, the recipient actors also face domestic challenges towards sustainability transition. Besides the aforementioned analysis on considering civil society in project design in the case of Kenya, in order to promote the energy transition, the Kenyan government should accelerate the domestic actors' role constellation on two aspects, inter alia: 1) streamlining the Kenyan electricity sector policies to be in line with the 2010 Constitution; 2) establishing clear regulations to mobilize both public and private finance to co-invest on renewables.

The 2010 Constitution divides Kenya into 47 counties, to which both political power and government functions are devolved. As the most far reaching institutional and public finance reform undertaken in Kenya to date (Ndii 2010), it requires adequate adjustments in the legal and regulatory framework of the energy sector. The fact that the current legal and regulatory framework for the sector is not aligned to the new Constitution, in terms of unbundling, poses hurdles in the renewable electricity promotion and the entry of IPPs, especially at the county level.

Under the Constitution, the functions of energy policy including electricity and gas reticulation and energy regulation have been assigned to the national government, while the planning and development are

assigned to the county governments. This could result in operational uncertainty in terms of the two levels of governments' responsibility. The county governments are lack of renewable expertise and management experience compared with the accumulated renewable resources at the national level, which may affect renewable electricity penetration and the localization of IPPs at the county level.

Meanwhile, the 2016 National Energy Policy reaffirms that the unbundling only occurs in the generation sector, and affirms the protection of state-owned companies in the sector. This will trigger conflict of interests between the incumbent generation, transmission and distribution utilities and the county governments. KenGen, KETRACO and Kenya Power have already established their own development plans at the local and regional levels with the previous regulatory and financial support from GoK as quasi-state-owned companies. It is rather questionable how much negotiation capital the county governments can mobilize to ensure the incumbent institutions' decisions contribute to the local county development. For instance, there is often inadequate infrastructure for power supply to communities in the neighborhood of generation plants.

Challenging as it is, the GoK should enable a favorable environment for benign relations between the incumbent electricity companies and the county governments, as well as new entrants. Meanwhile the county governments could take this advantage and enhance their resources and capacities to negotiate with the incumbent companies to safeguard the rights of local communities and to ensure that local communities benefit from development of the electricity supply infrastructure.

Secondly, renewable energy financing requires a clearer understanding of the current energy market. Eberhard et al. (2016) studied the Independent Power Producers (IPPs) development in many African countries including Kenya, and found an emerged hybrid energy market model where public and private investment coexist, although the incumbent state-owned utility remains intact and dominant, even as IPPs are invited into the market. As suggested by this paper, the Akiira geothermal project faces more challenges (less governmental and international support), and sustains more pressure from KenGen (failed test drilling service and less market share) in comparison with the situation of OrPower4 geothermal project. These practices indicate that the hybrid power market in Kenya has dual roles. On one hand, it promotes the geothermal electricity from KenGen, the incumbent state-owned utility, and restrains geothermal development from new private utilities. On the other hand, the hybrid market advances wind electricity from new entrants given that wind energy is among the low-cost energies in Kenya and it is not monopolized by the incumbent state-owned utility.

Effectively pulling together the financial resources from both public and private sectors in the hybrid energy market calls for regulatory guidance from the government. The 2013 Public Private Partnership (PPP) Act could help Kenya derive greater value for money from PPP projects through better project preparation, better risk allocation, increased transparency, and greater efficiency (SLS Group 2013).

However, the GoK's ambiguous attitude towards the role of private and public sectors remain as a challenge for attracting PPP projects in the electricity sector. For instance, in the 2016 National Energy Policy the sectors which are encouraged to adopt PPP model include oil, gas, and coal infrastructure, and exclude the renewable IPPs. As Donovan (2015) wrote when stressing on the importance of government policies to advance renewable investment, GoK should further clarify its determination of mobilizing financing through the PPP models.

Kenya has already attracted much public resources and support on renewable energy development from multilateral development banks, bilateral development agencies, and special purpose finance, such as the Clean Development Mechanism (CDM) (Ngugi 2012). Nonetheless, this financial support can be further mobilized with the PPP models to a larger scale, so as to help Kenya increase its electrification rate and to adopt more renewable energy, such as wind which is also among the low-cost energies in Kenya.

7.2.7 Niche level or regime level ODF intervention for SDGs

Since we are exploring how the ODF could help the infra-system's transition towards sustainability, it is necessary to discuss at which level the ODF provides as effective intervention for the realization of SDGs, and if there are different consequences if the intervention targets at niche or regime level.

The Lamu case and Olkaraia I and IV geothermal case revealed that the Chinese ODF seldom touch upon the infra-system regime level, which indicate that the impact onto regime level is limited. Shall the Chinese intervene at the regime level? The renewable transition history in Kenya demonstrated that the regime and niche level intervention by World Bank actually helped boost the energy transition. Does it mean that infra-system ODF shall intervene at both niche and regime levels?

The lessons from the structural adjustment programme by IMF and World Bank in the 1980s and merely focusing on governance approaches repeatedly tell us that there is no universal solution for all the countries given the divergent social-technical context. A workable plan effective in one nation may be disastrous in another nation. Therefore, the regime level interventions may fail, but it is only because that it is targeting on the regime level alone. The complex local context may not allow one desirable result.

Requiring the Chinese infra-system ODF to directly intervene at regime level seems rather challenging, considering the fact that these projects are mainly request-based and few countries would request proactively on the regime level intervention from China. Similarly, requiring the traditional ODF donors to shift from social sector to economic infra-system sector is also challenging, which may require a fundamental change of their ODF guiding principles, albeit the exceptions of Japan and South Korea.

It is undoubtable that China alone will not fulfill the infra-system's transition in Kenya or any other developing country, despite its comparative advantage in infra-system construction and associated ODF support. It is critical to obtain the niche level support from other donors as well, so as to accumulate niche experiences for regime level change. For instance, though China finances the geothermal drilling phase, the power plant and operation still call for support from France and Japan. All these efforts piled up as interventions to current energy regime in Kenya by enhancing the geothermal energy. Meanwhile, World Bank has its own capacity and advantage in mobilizing resources for regime-level intervention, such as promotion of renewable energy in institutions. Therefore, the ODF for infra-system transition calls for collaboration of multi donor actors and their coordination of different functions at both niche and regime levels, so as to help the sustainability transition and achieve the SDGs.

Chapter 8 Conclusion and future research

8.1 Conclusion, and originality

This dissertation connects two fields of studies – Official Development Finance (ODF) and Sustainability Transition (ST), since achieving the SDGs requires the international ODF to better finance the critical infra-system's transition, and ST theories can provide an analytical framework to examine the role of ODF in the transition process. We ask a fundamental question in this research: how can international ODF promote the infra-system's sustainability transition in developing countries?

Through the Lamu Port project, we found the Chinese ODF actors have changed their roles on mitigating the environmental and social risks quantitatively, marked by the Chinese contractor's almost fully paying attention to the negative ESRs, and taking countermeasures with relevant Kenyan government agencies to minimize these ESRs. The Chinese government has formulated several ministerial and cross-ministerial regulations to encourage Chinese financial institutions and companies to better perform on environmental issues, yet no mandatory legislation has been in place. And its current lack of interaction with Kenyan government may undermine the safeguards and pose obstacles for the transportation's sustainability transition. Therefore, Chinese government's single role change qualitatively would help the role constellation with other Chinese actors, as well as Kenyan actors, which may help motivate the transition.

The Olakaria I and IV geothermal project presented the interplay between traditional and Chinese donor actors with Kenyan geothermal actors. It revealed that both donor actors are not having much interaction in terms of coordinating their ODF operations in one project, which hinders sustainability transition. The lack of role constellation might be the reason for ESRs observed in the project site. Aid coordination may provide chances to overcome these challenges towards sustainability transition. However, it is unclear whether Chinese donor actors are willing to fully comply with the DAC donors' rule setting, especially with China's launching of the "Belt and Road Initiative" and the Asian Infrastructure Investment Bank (AIIB). To tackle the geothermal drilling financing difficulty, and considering the advantages of Germany and China in this field, we proposed a trilateral cooperation model, as an attempt to enhance role constellation for sustainability transition and examine the readiness of traditional donors and China in ODF cooperation.

After examining traditional and Chinese donor actors' role changes and role constellations, we reviewed the historical role of international ODF in promoting the renewable energy transition in the past decades in

Kenya. The Multi-Level Perspective (MLP) analysis demonstrated the critical role that international ODF played in unleashing renewable potentials in Kenya, and affecting the energy regime at both niche and regime levels. A further examination of three niche novelties employing geothermal and wind powers and their interplay with Kenya's energy regimes discovered some hurdles for future sustainability transition.

To summarize the three case studies in Kenya, these results suggest that the hypothesis holds true: ODF donors motivate the sustainability transition of infra-systems in Kenya by changing their roles quantitatively and qualitatively with sustainability considerations, and by active role constellation at both niche and regime levels among donors and recipient actors. If the role changes are not sustainable and role constellation are inactive, they hinder the sustainability transition.

The main originality and key contribution of this research is the cross-fertilization of two fields of studies, ODF and ST, for a better understanding of their relations in the global environmental studies.

First, the development study field faces the trend of emerging donors from the South, the debate of going beyond traditional ODA, and the urgency of financing infra-system in developing countries. However, the ODF study has not provided analytical framework to analyze how particular type of ODA or ODF help attain the SDGs for developing countries. Hence, the first contribution of this research is enriching the analytical framework of development aid by integrating the sustainability transition theories, which allows the design and evaluation of ODF projects in a bigger social-technical context and offers a clearer guidance towards sustainable development.

Second, in response to the emerging donors' joining the international aid architecture, scholars in the development study field have paid much attention on the debate of two groups of traditional and emerging donors. We hold the belief that it is more important to study how ODF, regardless its sources, can motivate the sustainability transition of infra-systems in developing countries, because the vision of ODF provision is to contribute to sustainable development of the developing countries although it is also a fact that several geo-political considerations are embedded by each donor. The second contribution of this research is finding out conditions and contexts with which donors can help promote the sustainability transition of infra-systems in developing countries, which goes beyond the dichotomy between traditional and emerging donors.

Other minor contributions include: 1) conducting community level survey to examine possible ESR of Chinese ODF-funded projects in Kenya, the first of this kind in a decade in Lamu; 2) exploring the approaches of financing geothermal drilling in Kenya, the most challenging stage of the entire geothermal project cycle, with the consideration of trilateral cooperation; 3) examining renewable electricity sector

reform from 1954 to 2016 in Kenya, the first of this kind about Kenya with the reference to archival records.

8.2 Some recommendations for future research

The current literatures on adopting sustainability transition theories to ODF studies is limited, and mainly in the infra-system domain, therefore, further studies on other cases from developing countries, and broader domains such as health and education, are required to better understand and guide sustainability transitions in the developing world. This research may provide primary conceptual theories on donor actors, their role change and role constellation based on the Kenya case. With more empirical evidence and examination, further refining the conceptualization of the donor actors, their role change and role constellation would be possible and desirable.

The research question this dissertation tried to answer – how international ODF donors motivate the developing countries' sustainable transition, shall be further studied. Especially within the context of both developed and developing countries' aiming to achieve the SDGs by 2030, where public and private finance shall cooperate to make the shifting from billions to trillions, how the international official development finance could be able to mobilize the non-official finance for sustainable development would be a question to be studied next. For instance, the direct incentive for the involvement of private sector is the market potential in the infra-system, and further research shall be conducted on how to foster the market by lowering the institutional and financial hurdles and risks so as to attract more private investors to contribute to the sustainability transitions.

Other detailed topics worthy of future study, in the fields of environmental economics and development studies, include: 1) for developing countries' governance capacity, how to respond to the community protest, and how to balance the economic and social benefits and environmental and social costs of developing infra-system projects; 2) for aid coordination, to what extent it could be effective and efficient between the traditional donors and among traditional and emerging donors; 3) for the future modalities of international ODF, what kind of modalities could better promote the sustainability transition and realize the SDGs? Follow the DAC donors' established rules, or emerging donors' South-South cooperation approaches, or the North-South trilateral cooperation; 4) for ODF effectiveness evaluation, given that donor driven evaluation is not recipient-focused or oriented, and challenges remain for recipient-led evaluation, if the researchers are the only independent evaluators to examine the realistic impacts of multi-donors ODF flowing into one recipient country.

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Appendix

Appendix 1: Policies issued by the Chinese government on governing overseas financial activities

Date	Institution :	Policy Description	Applicable to relevant body
2007	State Forestry Administration (SFA)	The "Guide on Sustainable Overseas Silviculture by Chinese Enterprises" governs the overseas practices of Chinese logging companies. It requires preservation of high-value forests and endangered species, monitoring systems, and consultations with local communities.	Any company engaging in logging/silvicul-ture
2008	China Export and Import Bank (China EXIM)	"Guidelines for Environmental and Social Impact Assessments of the China Export and Import Bank's Loan Projects" is an environmental policy requiring environmental impact assessments, monitoring, and review of project impacts for all projects. When deemed necessary, environmental and social responsibilities may be included in the loan contract.	*S*Projects receiving loans from China EXIM
2008	State Council	The State Council issued a regulation allowing the government to fine companies up to 1 million RMB if they commence a project without official approval, which includes requirements to abide by host country laws.	Chinese companies operating overseas
2008	National Audit Office department on overseas assets	The Audit Office announced this new department focusing on state-owned or central-capital controlled companies and overseas national assets. The department will seek to uncover any potential misuse of funds, with special attention to overseas state-owned assets. This oversight can prevent the use of illegal payments to gain approval for environmentally or socially sensitive projects.	State-owned or central-capital-co ntrolled companies with overseas national assets
2008	Industrial Bank of China	Industrial Bank, a joint-stock commercial bank, was the first Chinese financial institution to subscribe to the Equator Principles, a risk management framework internationally adopted by financial institutions, for determining, assessing and managing environmental and social risk in projects.	Receiving Industrial Bank financing
2009	SFA and Ministry of Commerce (MOFCOM)	Written by a joint task force, the "Guide to Sustainable Overseas Forests Management and Utilization by Chinese Enterprises" tells Chinese enterprises how to manage overseas forest resources.	Any company engaging in forest-related activities
2011	State-owned Assets Supervision and Administration Commission of the State Council (SASAC)	SASAC promulgated "Interim Measures on the Supervision and Administration of the Overseas State-owned Assets of Central Enterprises" and "Interim Measures on the Administration of the Overseas State-owned Property Rights of Central Enterprises." This supervision system provides direct influence over State Owned Enterprises (SOEs) and can be expanded to cover environmental and social issues.	SOEs

2012	SASAC	SASAC's preliminary supervision system of overseas assets was completed with the promulgation of the "Interim Measure for the Supervision and Administration of Central SOEs' Overseas Assets." This system can oversee the environmental and social issues arising from overseas investments.	SOEs
2012	China Banking Regulatory Commission (CBRC)	The CBRC released "Green Credit Guidelines", which establish guidance for Chinese banks financing overseas activities, including transparency, monitoring, and supervision.	Banks financing both domestic and overseas activities
2013	MOFCOM and Ministry of Environmental Protection (MEP)	The "Guidelines on Environmental Protection for Overseas Investment and Cooperation" require all Chinese companies operating overseas to conduct EIA, develop mitigation measures, and work with local communities to identify potential negative impacts of the investment.	Chinese companies operating overseas
2013	MEP, CBRC, National Development and Reform Commission (NDRC), People's Bank of China (PBC)	"Corporate Environmental Credit Rating Measures (on trial)" provides as a guide to rate the Chinese companies' environmental credits, urge companies to fulfill their environmental and social responsibilities. It links the environmental performance of the Chinese companies with their priorities to get loans from the Chinese financial institutions.	Any Chinese companies
2017	Green Finance Committee (GFC) of China Society for Finance and Banking, and six other quasi-government agencies	"Environmental Risk Management Initiative for China's Overseas Investment" encourages the Chinese financial institutions and companies strengthen the environmental risk management in overseas investments, follow the principle of responsible investment, and apply the green development concept into the "Belt and Road Initiative".	Chinese financial institutions and companies

Source: Author

Appendix 2: Thirty-five questionnaire respondents in Lamu County

No.	Tribe	Group			Location	Time
		Main group	Other group	Woman		
1	Bajuni	Fisherman/ woman		Woman	Kiunga	10:55-11:10, 20 Nov 2013
2	Bajuni		Farmer		Kiunga	12:06-12:29, 20 Nov 2013
3	Bajuni			Woman	Kiunga	14:00-14:17, 20 Nov 2013
4	Bajuni				Mkokoni	18:09-18:34, 20 Nov 2013
5	Bajuni				Kiunga	13:37-13:59, 21 Nov 2013
6	Bajuni		Village Leader		Mkokoni	17:43-18:07, 21 Nov 2013
7	Boni		Forest dweller		Mangai	11:33-12:06, 24 Nov 2013
8	Boni		Forest dweller		Mangai	12:41-13:26, 24 Nov 2013
9	Bajuni	Forest dweller	Farmer		Kiunga	16:13-16:35, 20 Nov 2013
10	Bajuni		Village Leader		Kiunga	11:19-12:00, 21 Nov 2013
11	Bajuni				Mkokoni	13:41-13:59, 22 Nov 2013
12	Boni			Woman	Mangai	14:20-14:49, 24 Nov 2013
13	Boni		Farmer	Woman	Milimani	12:05-12:53, 25 Nov 2013
14	Somali	Pastoralist			Kiunga	12:32-12:49, 20 Nov 2013
15	Somali			Woman	Kiunga	12:58-13:10, 20 Nov 2013
16	Bajuni		Fisherman		Kiunga	13:34-13:54, 20 Nov 2013
17	Somali				Milimani	13:15-13:51, 25 Nov 2013
18	Boni		Farmer		Bargoni	16:34-17:00, 25 Nov 2013
19	Kikuyu	Farmer		Woman	Mpeketoni	13:26-13:49, 19 Nov 2013
20	Bajuni				Kiunga	12:00-12:30, 21 Nov 2013
21	Bajuni				Mkokoni	10:05-10:37, 22 Nov 2013
22	Bajuni				Mkokoni	10:46-11:15, 22 Nov 2013
23	Boni		Village Leader		Mangai	13:30-14:10, 24 Nov 2013
24	Boni				Milimani	11:14-11:59, 25 Nov 2013
25	Boni				Bargoni	17:00-17:25, 25 Nov 2013
26	Kikuyu	Businessman/ woman			Mpeketoni	20:49-21:12, 18 Nov 2013
27	Somali			Woman	Kiunga	10:28-10:55, 20 Nov 2013
28	Bajuni				Kiunga	11:37-11:07, 20 Nov 2013
29	Bajuni				Kiunga	15:52-16:16, 21 Nov 2013
30	Bajuni			Woman	Mkokoni	9:20-9:35, 22 Nov 2013
31	Boni		Farmer&Fisherman		Bargoni	16:00-16:30, 25 Nov 2013
32	Kikuyu	Village Leader			Mpeketoni	20:22-20:31, 18 Nov 2013
33	Kikuyu				Mpeketoni	16:32-16:49, 19 Nov 2013
34	Bajuni				Kiunga	13:12-13:37, 21 Nov 2013
35	Boni				Basuba	17:30-18:20, 25 Nov 2013

Appendix 3: Open-ended questions for seven different groups

Group	Questions
Farmer	1. The history of doing farming in your family? Any changes on the way of farming in the past decade? 2. What/how do you grow? How many sheep/cows/poultry/donkeys do you raise? Do you sell your livestock? Or only for family use? 3. Besides farmer, are you also fisherman, forester, pastoralist or businessman? 4. What about the daily food and water, children education in your family? 5. How do you think about the building of the Lamu Port? Do you think it will affect your farming and your family? If so, how?
Forest dweller ***(Note: the people who live on the forest products and live in the forest)***	1. The history of collecting and logging in forest in your family? Any changes on the way of collecting and logging, and on the collection amount or logging amount in the past decade? Who is the owner of the forest where you operate? 2. How much percentage of your gain do you sell in the market or consume at home (like honey)? How is the earning? 3. Besides a forester, are you also fisher, pastoralist, farmer or businessman? 4. What about the daily food and water, children education in your family? 5. How do you think about the building of the Lamu Port? Do you think it will affect your operation in forest and your family? If so, how?
Fisherman/woman	1. What is the history of fishing in your family? Have there been any changes on the fishing tool and catching amount in the past decade? 2. How/how/where often do you go fishing? How big is the percentage of your catch do you sell in the market or consume at home? How is the earning from any catch you sell? 3. Besides fishing, are you also forester, pastoralist, farmer or businessman? 4. What about the daily food and water, children education in your family? 5. How do you think about the building of the Lamu Port? Do you think it will affect your fishing and your family? If so, how? 6. If you can no longer fish, what would you do?
Pastoralist	1. The history of grazing in your family? Any changes on the grazing style and raising/harvest amount in the past decade? Who is the owner of the pasture? 2. How do you graze? How many sheep/cows/poultry/donkeys do you raise? How much percentage do you sell in the market or consume at home? How is the earning? 3. Besides pastoralist, are you also fisherman, forester, farmer or businessman? 4. What about the daily food and water, children education in your family?

	5. How do you think about the building of the Lamu Port? Do you think it will affect your grazing and your family? If so, how?
Businessman/woman	1. The history of doing business in your family? Any changes on the business and earning in past decade? 2. What do you do as businessman/woman? How is the earning? 3. Besides businessman/woman, are you also forester, pastoralist, farmer or fisherman? 4. What about the daily food and water, children education in your family? 5. How do you think about the building of the Lamu Port? Do you think it will affect your business and your family? If so, how?
Women	1. What is your role in your family? What/how do you do the housework at home? In case of being employed: what is your job? How is the earning? 2. Any changes on what the wife do and what the husband do in your family in the past decade? Who owns the land, forest, pasture in your family? 3. What about the daily food and water, children education in your family? 4. How do you think about the building of the Lamu Port? Do you think it will affect you and your family? If so, how?
Village Leaders ***(Note: the leading people who are mostly the elder as well, and the teacher)***	1. The history of your taking this role? Any changes in past decade? 2. What do you do in your role? How is the earning? 3. Besides this role, do you have other roles like forester, pastoralist, farmer or fisherman/woman, businessman/woman? 4. What about the daily food and water, children education in your family? How do you think about the building of the Lamu Port? Do you think it will affect your role and your family? If so, how?

Appendix 4: Fifteen closed questions with multi-choices

1. Do you think there are changes in the environment near your family, like forest, pasture, marine and farmland in the past decades?
   A. Changed completely; B. Changed a lot; C. Changed a little; D. No change at all.
   If changed, in what way: _____.
2. If changed, have these changes affected the way of your family's making a living?
   A. Changed completely; B. Changed a lot; C. Changed a little; D. No change at all.
3. Do you know there is going to be a new Lamu Port and associated infrastructure construction (hereafter 'the construction')?
   A. Yes; B. No; C. I don't know.
4. Do you think the construction will affect the environment near your family?
   A. Yes; B. No; C. I don't know.
5. If affected, do you think the changes in the environment will affect the way of your family's making a living?
   A. Will change completely; B. Will change a lot; C. Will change a little; D. No.
   If changed, in what way: _____.
6. If affected in your opinion, have you been notified by any government organization about the construction plan?
   A. Yes; B. No; C. I don't know.
7. Do you think the construction will provide you a job?
   A. Yes; B. No; C. I don't know.
   If yes, do you want to be worker in the construction?
   A. Yes; B. No; C. I don't know. And why yes or no: _____.
8. Do you worry about the increasing workers/employees from outside of Lamu in the process of construction?
   A. Yes; B. No; C. I don't know. If yes, in what way: _____.
9. Do you worry about the potential increasing STI diseases (in Swahili: magonjwa ya zina) in Lamu?
   A. Yes; B. No; C. I don't know. If yes, any suggestions: _____.
10. Do you think the construction will affect your land or make you move from current place?
    A. Yes; B. No; C. I don't know.
    If yes, do you want to give up your land or move your family?
    A. Only if the compensation is agreeable; B. Don't want to even the compensation is enough.
11. If you don't agree to give up your land or move, will you choose to stay?
    A. Yes; B. No; C. I don't know.
12. Do you think the construction will affect your community culture and/or the Swahili culture, like the custom, architecture or sacred items/places in your belief/religion?
    A. Will change completely; B. Will change a lot; C. Will change a little; D. Will not change.
    If yes, in what way: _____.
13. As far as you know, is there any meeting or discussion in your community about the possible impacts of the construction?
    A. Yes; B. No; C. I don't know.
    If yes, who was part of the discussion: _____. And any result: _____.

14. What might be the good impacts after the construction, if you think there are? (can choose more than one)

A. Improved road/transportation network; B. More job opportunities;
C. Modern and convenient life; D. Earn more money from tourism; E. Others: _____.

15. What might be the bad impacts after the construction, if you think there are? (can choose more than one)

A. Bad environment changes; B. More social insecurity issues; C. More health problems/diseases;
D. Loss of livelihood, like income; E. Others: _____.

Appendix 5: List of interviews with various actors

No.	Number of representatives	Organization	Date	Period
1	3	Institute of Law and Environment Governance, Kenya	10 October, 2013	During internship period
2	7	WWF-Eastern and Southern Africa Regional Programme Office (ESARPO), WWF- Coastal Kenya Programme (CKP)	14 October, 2013	
3	2	WWF-International	23 October, 2013	
4	1	China Council for International Cooperation on Environment and Development (CCICED)	24 October, 2013	
5	1	African Branch, China Daily	27 October, 2013	
6	1	Kenya Wildlife Service (KWS)	28 October, 2013	
7	3	Ministry of Environmental Protection, China	28 October, 2013	
8	2	WWF-South Africa	29 October, 2013	
9	1	WWF-International	5 November, 2013	
10	2	Chinese Embassy in Kenya	6 November, 2013	
11	1	China Overseas Engineering Group, Kenya Office	8 November, 2013	
12	1	Sinohydro Corporation	13 November, 2013	
13	2	JICA Kenya Office	15 November, 2013	
14	3	WWF-Sweden	17 November, 2013	
15	2	Lamu County Government	26 November, 2013	
16	1	Save the Lamu	26 November, 2013	
17	5	African Station, China Central Television (CCTV)	23 November, 2013	
18	4	African Regional Bureau, Xinhua News Agency	28 November, 2013	
19	3	China Road and Bridge Company (CRBC)	29 November, 2013	
20	3	WWF-China	16 April, 2014	Follow up
21	10	African researchers	27-30 May, 2014	
22	1	China Road and Bridge Company (CRBC)	25 November, 2017	
Total			59	

Appendix 6: How the livelihoods of seven groups depend on natural resources

Group	Activity	Scale	Gender	Place	Time/duration of activity	Equipment	Practice		Usage
							Traditional	Modern	
Fisherman/ woman	Fishing	1 or more, up to 50	For a group, only men;	Ocean and river	Ocean fishing: 5-6 hours/Day for small group; one day to one week for big group. River fishing: from morning to afternoon	Nets with mesh larger than 2-3 inches to let undersize fish escape. Dhows	Ocean fishing: follow the rule of tides River fishing: use trap nets	/	For large group fishing, sell to dealers; For small group, only sell the left after family use
	Lobster catching	1-3	Man	Ocean	5-6 hours/Day	Second-hand aquaboard, goggles	Dive deep in the ocean, and use dead octopus to scare the lobster away into the net behind it	Rather modern gears, mostly second-hand	Mainly for selling, only eat the dead catch
	Seashell collecting	1 or more	Woman	Beach	Irregular	No special equipment	Collect the unbroken shells, especially the expensive cowries	/	Make and sell shell-necklaces to dealers
Forest Dweller	Honey collecting	1-3	Man	Forest	1-7 days	Matches	First search a special bird that lives close to bees, and follow them, or search by himself/herself based on experience; make a fire, and smoke away the bees; enlarge the hole and collect the honey	Though introduced man-made beehive, still stick to the traditional way	For family use and selling, depending on the amount of honey collected
	Mangrove collecting	2-10	Man	Mangrove forest	One week	Dhows	Cut down the mangroves, and tie them aside the dhow. Once cut, take all out. Collect all the nine kinds in the region after registering for operation in the marine protected area	/	Family use, and sell to villagers, to build houses, dhows, furniture, for fuel wood, medicine
	Firewood, food and herb collecting	6-7	Women and only 1-2 men for preventi ng from wildlife	Forest	Depends, almost every day	No special equipment	When cut they plant to assure the collection at dry seasons. Collect Tiel, a fruit of Ichile tree, dry the seeds, crash to powder for bread and Ugali, main food in the region; Collect herb leaves of Agakari for malaria, and Mbalambal for coughing	/	Family use only

Pastoralist	Shifting grazing	2-3 families	Somali tribe families	Pasture	2-6 months in one area, depending on the rain	No special equipment	Shift before the grassland is eaten up	Consider settling down for children's education	Main food is milk. Only sell when need money
	Sedentary grazing	Family unit	Somali tribe families	Pasture	From morning to evening	No special equipment	Take the cattle or goats out at mornings and take back at evenings	Normally hire someone for grazing	Don't eat, only sell
Farmer	Farming	Family unit	Family	Farmland	Some go in the morning and come back in the afternoon. Some live on the farm from Saturday to Thursday, and only come back to village on Fridays for Muslim activities	No special equipment. Use hands to plough (due to no truck)	Swidden cultivation. Depend heavily on rain, and only use well water for some trees. One household has 4-50 acres of land. Not all are explored, due to lack of money or labor, and some lands are infertile. Plant coconut trees, mango trees, pawpaw, cashew nut, simsim, cow beans, sorghum and maize. Use cow dung as fertilizer, but mostly don't use fertilizer.	/	First for family use, and only sell the rest, because no proper crop storage at home
Businessman /woman	Running shops as formal selling	Individual/family	Both	In the village	Daily	No special equipment	Farming and fishing as well	Sell groceries, clothes, and building materials	Family use
Woman	Collecting firewood, food and herb from forest, and collecting drinking water, and other activities	Depends	Woman	Forest, river, ocean, village	Daily	No special equipment	For water, they walk with the containers to collect water from the Djabia that collects rainwater, or the wells near the Mangai River, for three or more times per day. For firewood, food and herb, refer to the forest dweller.	Informal selling for extra income: hand-made handicrafts out of the flip-flops and seashells collected on the beach; local snacks like the seeds of baobab trees	Family use
Village leader	Maintaining the law and order	Individual	Man	Village	Daily	No special equipment	Farming as well	Act as leaders in the villages	Family use

Source: Author

Appendix 7: Samples of transcripts of the questionnaire

No.4
Site: Mkokoni Village
Interviewee: Fisherman
Interviewer: Author
Date: 2013/11/20
Start: 18:09 **End**: 18:34

(Transcription)
I have been fishing for 50 years. I have seen the changes, which is big. Before, the fishing is very few. You are getting high catch. But now it is the modern fishing. People are using modern fishing. For our artisanal fishing, we are only in the inner reef fishing. For big catch, we have to go to outer reef. From the land to the fishing ground, it will take one hour to one and a half hours. For the daytime, it will take 5 to 6 hours. Sometimes we go fishing for overnight. Before you can get 800 to 1000 kg per day, including sharks, tuna, and king fish. Even sometimes you can get very good catch, and cannot take all of them. And just throw some back to the sea. For now, sometimes you get sharks for 100-200 kg. Here in Mkokoni, we don't have a market. In 1960s, 1 kg of fish is 30 cents. And now is 100 Ksh per kg. We are 11 in my family. I want to teach my children the way of fishing. One has already fished the Secondary School. One has finished the KCPE. And others are in the primary school.
I am the chairman of the Mkokoni BMU (Beach Management Unit). My objective is to improve marine fishery, to have good boat. I have a plan of prawns farming in Mkokoni. We have a total of 67 men and 46 women in BMU. We have a combined age: youth group, women group, and Eco-tourism group. They are all under the BMU.
We eat rice, Ugali, chapatti, scones, and beans. We are getting the water from the well and the Chris Hotel (a hotel in Mkokoni provides filtered water to local villagers). There are changes in the environments near my family. First we were affected by the tsunami, the coral were damaged. The fish were taken away by the tsunami.
Our livelihood will be only farming. We don't think we can go fishing any more after the Lamu Port construction. I choose B. It will also change the livelihood of my family. We are not getting the products from the farming. And the catch of fishing is low. There are also human-animal conflicts, especially the buffalo. I choose C a little. But that is for current. And it will be more after the port construction. I know about the Lamu Port construction. But we are not fully engaged. So sometimes we don't know. I heard people discussing the construction of Lamu Port. For the construction, it will affect the environment near my family. I choose for A. The construction will have a bad environment impacts, the mangroves and the turtles due to the oil leak. Even a problem for the coral reef, due to the same reason. After the construction, there will be job opportunities, but will be very few. Because I am a witness of the Kilindini Port in Mombasa. Our people from the coast did not get the job from Mombasa. I choose A. I would like to work for Lamu Port construction. I decided to go because I know there will be no fishing after the construction. I am worried about the increasing number of people from outside of Lamu. I worried about the port will be there. But it won't help the people from the coast. I worried about more diseases and drugs, more crime. This will be contributed by more ships coming from outside, and maybe the government cannot control. Maybe the officers can be given something like the corruption. My opinion is that they could have involve the local community before the Lamu Port construction. If there is any problems, the outsider will run away. But I will stay because I am originally from here. More diseases will be brought in by the outsiders, as well as the crime. Because they have money, and the girls will easily go with them. I suggest the government having plans to control these diseases. I worried about the land issue. And maybe I will be moved from my place. I just heard the issue that if the map shows the road will pass the land, it will pass the land. So the government can take the land, and I am given nothing. The government also plans to drill the oil. And the people living near should also be moved from that region. I am not ready to move if the government asks me to move. I choose B. I cannot move even if they give me some compensation. Because I know it will be very little. So I choose to stay. I choose A. I am worried about our culture and tradition will be changed. I choose for A. The increasing of people will have their culture. They don't wear in a good manner, and they wear like naked. And also for the men, they have money. And our girls will choose to go for them. Our religion will also be

destroyed. Because we are going to have more clubs. I heard people discussing and meeting about Lamu Port. For the meeting and discussion, Shungwaya and Save the Lamu facilitated them. There is no result, because the government has no reply to our requests. There are bad impacts after the port construction, but also good impacts. Since there are ships and vehicles coming, we expect good things and also bad impacts. For advantages, we can have small hotel and people can have restaurants. We are going to have a modern village. We are going to have a good road and good transport. I choose ACD. For the bad impacts, we will lose the livelihood because more ships will come and no fishing any more. Another thing we are going to lose income is because many people are not educated, and cannot get the job from port, especially for the fisherman. And the other thing is that fisherman cannot go fishing because more sharks will follow the ships into the inner reef region. Also insecurities, and diseases, the STI and drugs.

No.10
Site: Kiunga Village
Interviewee: Forest dweller
Interviewer: Author
Date: 2013/11/21
Start: 11:19 **End**: 12:00

Before I was a fisherman for 15 years. 40-50 kilograms for one day in the past. Now I collect the mangroves. Because I am getting older and I cannot go very far. The mangroves are closer to me.
I would stay for the whole night when I went for fishing. I anchored in the open sea and then sleep in the dhow. I have 6 people in my family. I have 3 children and 4 grandchildren now as well. Some go to the secondary school. And one is in the army.
I was using fishing lines. No. One is 20, and No. Two is 40. Because the fish is big, I am supposed to use the thick one. I eat rice, chapatti, fish for every day. We buy goats, but every day is fish. We get the water from djabia.
I have being collecting the mangrove for 10 years. We go to the mangroves for one week. Then we take out the mangroves and come back. Once a week. We stay in the mangroves for one week. We sleep there on the trees. We go three or two people. We take everything with us, the dry fish. We use score as the unit. We call 20 pieces of mangroves one score. One to three people for one time can collect 15 scores. We use another type of carrying the mangroves instead of putting them in the dhow. We tie them aside. There are two wings for one dhow. Because they are wood, it becomes lighter. I follow my parents about the skills of collecting mangroves. Now I am teaching the young man. We sell the mangroves to the villagers in Kiunga who want to build their houses, not selling to outsiders. Because it is not allowed to sell to the outsiders.
I don't have to have a permit to collect the mangroves. But we are authorized by KWS (Kenya Wildlife Service). We write a letter as an application to collect the mangroves. They bring a letter from them. There are regulations that I cannot destroy the environment while collecting the mangroves. You can only the trees that you want. You cannot leave them there after cutting. Once you cut, you have to take them out. There are nine species of mangroves here. We can cut all the kinds.
For the 15 scores we get for one week, there are many types of prices. 250 KSH per score for one kind, Fito. There are others, Maa, for 5000 KSH per score. Sometimes we cannot reach to the mangroves because of the low water. Every month maybe only two times we can reach there. People use the mangroves to build the houses, the dhows. People will use the dead trees from bush for fuel wood. People also use the mangroves for medicine. The Mutu is the medicine for mosquito. When you burn the Muto, the mosquitos will go away. Mkomafi is a medicine for stomachache. The Mlilana can be used to make the toy for the children, and also the furniture.
After colleting the mangroves at the daytime, we will use the fishing lines to catch fish at nights, because we are there. After catching, we just eat them as food.
I am the headman of Kiunga. Now Kiunga is mixed with many tribes. We have many Somali refugees coming here. They are not apart. We are living together. We also have the Bajun, Boni, and Gosha that is a tribe also coming from Somali. We have about 600 families in total in Kiunga. I don't have the population data now. We have about 1200 votes. Those are mature people. The oldest people can be over 90 years old. We have 300-400 fishermen, 20-25 collecting the mangroves. Boni people are mainly the forest dwellers. Somali people, about 20-25, are mainly grazing. Most of people are fishermen and farmers at the same time.
Fishing is the main revenue source for Kiunga Village. You can't go fishing without the license. 100 KSH

per year for one permit. And then you can join the fisherman cooperative. After paying 50 KSH per year to BMU, you can become a member of the Beach Management Unit (BMU). The benefit for the member is that you will be given the fund if there are some from the donors. And fot the fisherman cooperative, you can get the loan from the share of the cooperative.
There are also women group and youth group. They collect the shells and sell the products of shells. We have one primary school and one secondary school.
For the political structure, we have a new system now. We have one county governor.
When we go to the meetings and seminars, we are told about the port and the possible environmental changes. There are many changes. Before there were only 2 boats, and each time we could catch 2-3 tons. Now we have 10-15 boats. They even cannot catch 1 ton. The fish catching is decreasing. For the mangroves, before you could get them when you went there (pointing a site that is very close to the interview place). But now you have to go further. The changes are a lot. The changes affected my life. It is a little. I know there is going to be a new port in Lamu. It will affect the environment in Kiunga. It will affect my collecting mangroves and fishing as well. Because of the oil pollution, the fish will go further. Though I work as the headman, but the government does not pay me. There are meetings talking about the port. We are asked to train our children, so that they can work there. I think it will give me a job. My age doesn't allow me to work there, since I am over 50. I will send my son and daughter to college, and then work there. I am worried about the outsiders. Because we want to be given the first consideration of the jobs. I am worried about the STI diseases. If the 75 percent of the workers are Lamu people, and other 25 percent are from outside. I suggest people using the condoms and more education from the government. The medical center in Kiunga gives the free pills to people. As for the HIV rate in Kiunga, we are not very sure. We are just told by the doctors that it is 6 percent. I don't know whether they are making people scared and not to do that. But I am not sure as a headman. I am using the same language to educate the youth. I think I will be moved because a road will be built through our farmlands. The road will be built to Somali. When they pay us, I am OK to move. If there is no compensation, because we don't have the Title Deed, we will just go. New people will come from different sites. I am worried about the religion most. I think the changes will be a little. There are some discussions. But informal. And not in the governmental level. So we are telling the people you should be prepared when the road is there and through the farmlands, you should be paid.
If you want to access to the Sub-Chief, you have to come to me first. And after the Sub-Chief, it is Chief. And then, to a higher level, we have the District Officer (DO), District Commissioner (DC), and the Provision Commissioner (PC) which is from here from Mombasa. Starting from the Sub-Chief, they are employed by the government and paid.
In parallel, we have the Lamu county government. We have 3 County Representatives (Kiunga, Boni, and Faza), and then 2 Member of Parliament (Lamu East and Lamu West), and then 1 Woman Representative (Lamu County), 1 Senator (Lamu County), and 1 County Governor (Lamu County).
For the good impacts, all of them. For the bad impacts, all of them.

No.13
Site: Milimani Village
Interviewee: Fisherman
Interviewer: Author
Date: 2013/11/25
Start: 12:05 **End**: 12:53

I collect from the Ichile tree in the Community Lungi Forest. The bark of Ichile tree trunk is called Mkarabaka, as the food. I also collect the top of Ichile tree. Its fruit is Tiel. It has seeds and we dry it. We crash the dried seeds, and get the powder to make bread and ugali. I was born in 1961. When I was born, people were doing that. I joined my parents when I was about 5 years old. Apart from this food, we also collect the herbs. They cure the malaria, cough. We use the forest to collect the leaves as medicine. The tree for malaria is Agakari, and the one for cough is Mbalambal. I collect the leaves for family use only. Not for sell.
The food we get from the forest is our food at the dry season. So we don't sell them. We are very careful. When we cut we plant the others, to make sure that we have collect at the dry season. We are doing it in a sustainable way. When we get the bark of the Ichile, there will be many young trees coming out near the tree we cut, just like the banana tree. So they generate by themselves.

Besides going to the forest, we sometimes do farming. I have only 2 acres. Because we only have 2 family members, and I have 1 daughter. I plant maize, beans, and cassava. Sometimes when the harvest is good, I sell in the village for some money. In the past, the harvest is better. Now there are many wildlife, like buffalos and baboons. They destroyed the crops. Because of the El Nino, the rain is not reliable any more. Before we could collect a large quantity of Mkarabaka. But now it is reduced. For one day, I can collect 7 kg of Mkarabaka now. In the past, we harvested a lot. I couldn't estimate the amount, but it was more.
I am the owner of the land. In this village, nobody has the Title Deed. We can do whatever we want on the land we own. The main food we eat is maize. Sometimes we sell some of the maize, we can go and buy rice. I go to the Dowla River to collect the water for 3 times every day. I go with my daughter. In total we need 6 boxes of water. My daughter is 18 years. She went to grade 8 of primary school. Since those days, the women mainly go to the forest to collect the Ichile. The men go to collect the honey.
Initially there were no primary school and hospital here. But now we have a primary school and dispensary. For the toilets built by the World Concern, it depends. They are allocated to some people. For example, these eight people use this one. Some people manage well and keep it clean. There is no mosquito problem. The changes are a little. Even there is a dispensary, but there is no doctor. The changes come to my daughter. She doesn't like to eat the Mkarabaka and Tiel. She only wants to eat maize, and rice, and some spicy. The changes are a lot. I heard about the port. It is good. But when it comes, it will break the house which belongs to them. The changes are a lot. We hear from the others, but we don't know the details. Because I am illiterate. I think I can only get the jobs of cleaning and cooking. I would like to work for the port. I am worried that the outsiders will destroy the conservation areas. Like the forest where we get our food. It is likely that there will be more STI diseases. We cannot afford the medicine. I want the government to provide the medicine and the condoms. Those who are affected can sustain their lives. So far there is no this kind of center. And there is no one affected by these STI diseases. I only worry that in future after the port. But at the moment, everything is fine. I think they will replace us, but I don't like that. Only if the compensation is enough. I won't leave if there is no compensation from the government. When the port comes, I myself, and also the children, will not change my religion. The people at my age won't. But I worry about the children. The changes to the young will be a lot. The outsiders will come, and they will intermarriage. They will expose the business here. And in this way the old will be affected. We talked when meet but there is no organized meeting. The old talked that we would not leave if there is no compensation. But the young are very happy. For the good impacts, I choose ABC. I don't expect the income from the tourists. For the bad ones, I choose ACD. There is no social insecurities.

No.14
Site: Kiunga Village
Interviewee: Pastoralist
Interviewer: Author
Date: 2013/11/20
Start: 12:32 **End**: 12:49

I am 40 year old. 31 years of grazing by now. I started my grazing since a child, 10 years old. I have no other work to do. There are some changes. Before, we have more rain and food for the cattle. Nowadays, less rain and food. Before few, only 3 families, people did grazing. Now more people, about 70 families, are grazing. I have 8 goats, 7 cattle, and 7 chickens. Last year some goats died. I do grazing far to Kiungwa during the dry season, to search for water. During the rain season, I just near Kiunga. Right now, the goat and cattle are in Ishakani, near boarder, to avoid the conflicts with the neighbors. I take them to the grassland, which is the government land. Everyday I take them to the grassland from 6 am in the morning until 6pm in the evening. I take my cattle for selling to pay school fees. Sometimes we slaughter them and eat as the food at home. I also do farming and business. I buy the cattle from others and sell at other places. I have 2 acres for farming. My work is grazing. I don't do other business more than selling the cattles. My daily food is maize, wheat as main food. Sometimes meats. Here we have water problem. It is the key problem here. We are using Djabia water. When finished the djabia water, then we ask the CDF to assist with the Mangai water. I have 12 children in total. Two have finished the 2nd school. One has finished the Form 1 (grade 1 in 2nd school). One has finished the KCPE. The rest are in primary school. I love to send them to college. But the problem is the finance.
There are some changes in the environment near my family. Before we had more rainfall. But now the

rainfall is limited and the population is increasing. The grassland is not as good as before. And you cannot go far end because of the insecurity. Before we have very few pastoralists, now the population has increased. There are more animal diseases than before, which is a problem. The changes we can put them as a lot. I am aware of the Lamu port construction. I am not worried about the changed by the port to the environment near my family. I just hope that my children can get jobs from the Lamu Port. According to my age, I am not ready to work for the Lamu Port Construction. I am not educated, and I don't know what kind of job I can work there. My worries are that more people are coming from outside of Lamu after the construction. I even worried about the STI diseases after the construction. I suggested that we have workshop or seminar to give the people the education regarding to the STI diseases. I am worried about the Lamu Port. Maybe I will lose my land and move my family, because I don't have the Title Deed (land permit). I think many people will have to move from their current places. I am not ready to give my land if there is no compensation. I decide to stay here. I think the increasing people in Lamu, we are going to lose our culture. Some people can benefit from the Lamu Port construction, while some people cannot. More people coming outside will influence the people of lamu regarding to the culture. I don't know about the impacts. But I heard the people near the Lamu Port saying that maybe they will lose their land. After the Lamu Port, it can create job opportunities, and our road will have good conditions. As well as the income from the tourism and modern life. Bad impacts are that people are going to lose their land.

No.21
Site: Mkokoni Village
Interviewee: Farmer
Interviewer: Author
Date: 2013/11/22
Start: 10:05 **End**: 10:37

I have been farming for 15 years. Before I only had 10 acres. Then another 15 acres (later another 10). I want to expand my land, because now the land is valued, and people are fighting for land. I have children and also grandchildren. When I pass away, my children can divide the land. I use to clear the land by fire, and clean to plant. We plant for food for my family, and also I plant the cash crop. But the animals are disturbing us. You need to put the fence to protect the land, or else the animals will destroy the farm. The government has done nothing to prevent from these animals. We are not improving, because the buffalos also go for the cash crop, like the cashew nut. We also plant the maize, and we need to protect it from the animals, day and night. For day, we look for the baboons and for night the buffalos. I have three lands. The 15 one is very near (20 minutes of walking), but the other two 10 acres farms are very far away. We are not taking permit when you want to make your farm. You just alert the Chief, and you go for farming. There are some crops need water. We have got an old well in the bush. The finance is not good. So we don’t have the money to repair the old well. That area we get fresh water. I think we are going to have cash crops (a plant can live for a long time, like the mango and coconut). We are just waiting whether the government can give us the help, or any other organization. Because that area is good for farming due to the good water. I always go the three lands every day. I am not taking my wife and children for the far farms because of insecurity. When the school is closed, my wife and children will come to help me, especially during planting time, but daytime only. The near farm is 15-20 minutes. And my family can easily go, but the other two are at the far end. I plant mango, pawpaw, cashew nut in my farm. There are three of them. One has all of them. One has no plant (maybe only at rainy season for maize), and another one is for cash crop. During the rainy season, I plant maize and beans. We only get the product for food at home, and we don't sell. Because we get a little after the destruction by animals. If you will get help from the government, we will get more products from those farms. 10 people have large farms (in Mkokoni). The person who has the largest farm has passed away now. He has 40 acres in total in 4 farms (10 acres for one).
There are some changes, like low rainfall. Before the rain was good, we depend on rain to succeed in farming. The place now is a good place. If we get the wells, we can plant and water at dry seasons. The land has better quality than before. We don't have fertilizer. The government should give us. I don't have money to buy the fertilizer. But the government only supports the other villages (for free). For the seed, we put by ourselves. Sometimes we buy at Mpeketoni and Hindi (near Mokowe). Sometimes the government brings the seed to us. I only have two chickens. And sometimes we sell the products for one season (6 months), we can get 20,000 Ksh. We are selling the Simsim to Lamu. The shop we are selling at Lamu is called Sheebakari. That place has machine to make the oil. We are 12 people in my family. 10 are the children. 6 stay at the

primary school. The other children have finished Secondary School. One finished the college and now is a teacher. 2 of them didn't go to Secondary School, and they already got the jobs. I want my children to go to Secondary Schools and colleges. I eat rice, ugali and sometimes fish. We don't have meat here. Maybe sometimes someone slaughter a goat, and then we will have some meat. I get the water from Djabia and well. And also from Chris (Chris, the owner of the hotel mainly, stays in London. Bruce , coming from Shella, mainly stays at Mkokoni, and he knows the skill of filtering water from salty sea water).
There are changes already happening. For example, someone can take your land. There will be lots of changes. Like the channel near the port will be closed. We are going to get effects after the construction. There is change in the livelihood in my family. It will change a lot. Because the coastal people are not going for education. And they are not going to get the jobs from the port. They are going to lose their rights. I heard about the Lamu Port construction. After the construction, the effects to the environment will happen near my family. There are changes in my livelihood. We are very far from the port. And the land grabbers are taking the land near the port site, and also are getting to us. The place they want to get the land is my farm. Since they have money, I will lose my land. I choose B. the government also informs us the port. We don't agree with the government, because we want to have our rights. If the people are not getting the rights, the port shouldn't be built. There will be job opportunities. But these are for those who go to high education. Like people go to Uganda to study. I would like to work there. But I know I won't get the chances easily. I am ready to leave my farm and go to work at that place. I only farm because I don't have other work to do. I am worried about the increasing people after the construction. Because the port area is large, there will be many job opportunities, and many people will go there. I am worried about the STI diseases. We always give our opinions to the government. But they don't react and they continue to build the port. For the diseases, the government should have more doctors and more hospitals to treat the diseases. The doctors test the people and treat them. I am worried about the land issues. Since the port started, the land problem started. I will not move even if I get the compensation. I choose AB. I choose to stay. I am worried about the cultural changes. Because the increasing people come from outside. I choose B. Some of the people will be angry, and will not agree those people come and grab the land. There are discussions and meetings talking about the port by the Chief. They are talking about the advantages and disadvantages of the port. Good impacts: ABCD. For the bad ones: ABCD.

No.30
Site: Mkokoni Village
Interviewee: Businessman/woman
Interviewer: Author
Date: 2013/11/22
Start: 9:20 **End**: 9:35

I have been doing business for 15 years. There is no change for the good I sell in the 15 years. I get clothes from Mombasa. I use to travel to Mombasa and come back with the clothes. I use to sell the tradition clothes and modern ones. All of them are popular with the villagers. The income depends. If the community gets employment, the sell is good. If no, the business is not good. I have 5 members in my family. I have 3 children, 1 in secondary school, and 2 are learning in college. I want to my children to go for college. My husband works at the Kiwayu Safara Village as a waiter. But now the village is closed because of the al-shabab. My husband and I are from Mkokoni originally. I eat rice, beans and sometimes fish. I get my drinking water from well, from Djabia, and from Chris. For the housework, I am doing the house cleaning and washing clothes. My business is open when everybody comes to knock at the door and buy things. The people in Mkokoni who have ID cards are about 300. 50 percent come to do business with me. This is the only shop selling clothes in Mkokoni. But there are other shops for clothes in Kiunga, Kiwayu and Faza.
I grow up here in Mkokoni, and see many changes, like less rainfall, no job opportunities, and more children going to school to learn. I choose change a lot. The change will influence my life. It is a lot. I heard that there is going to be a Lamu Port construction. I don't know if there will be any changes after the construction. The government has introduced to us about the construction. I don't know if the port will give me a job. I am very far away from the construction, and I don't have the skill for it. But I would like to work for the construction. But if I am supposed to close my shop, I will not go for that job. I am worried that there are going to be more people after the construction. This is because people will come from different places. I am worried that there is going to be HIV diseases. I suggest the government bring in education. I also worried

about I may be moved from my place to other places. I don't want to move even if the government gives me enough compensation. I am not worried about the changes in our culture and traditions. I have not heard any meeting talking about the Lamu Port construction. But I heard people talking about the construction, like the youth will get the jobs. For the good impacts, I choose BD. For the bad impacts, I choose AC.
After the construction, my business will improve. When I need to go to Mombasa, I take a boat from Mkokoni to Lamu, and a bus to Mombasa. If I take a speedboat, it is 1 hour. And for the bus to Mombasa, it is 7 hours. After the construction, it will be the same hours for me to go to Mombasa. And there will be no changes. Besides the clothes shop, we have 3 other shops in Mkokoni. In total we have 4 shops in Mkokoni.

No.34
Site: Kiunga Village
Interviewee: Village Leader
Interviewer: Author
Date: 2013/11/21
Start: 13:12 **End**: 13:37

As the Sub-Chief, I am the link between the government and the community. We tell the people the policies from the government. Most of the community members in Kiunga are fishermen. We tell them not to catch the small fish. We teach them the net size should be bigger than 4 inches. So the small ones can go through the holes. And also the lobsters. We teach them not to catch the turtles. When they catch and eat the turtles, our children will not see the turtles, and can only see them in the pictures. Before WWF was here, people here eat the turtles as fish. Some people used the turtles as medicine for asthma. Up to now some fishermen are shouting why the government banned the catching the turtles. When we preserve the turtles, the Somali people will catch them and eat. We preserve here and they eat there.
5500 people live in Kiunga District. In the town we have 3200 people. We have 300 fishermen in the town. Most people here do grazing and farming at the same time. Bajun are fishermen, and the Somali are grazing. But all are farming during the rain season. They plant maize and cultivate and harvest. The book containing all these info are the Chief and me. There are no real books about these info. We have about 2500 women, 2000 men and 1000 children. The average life expand here is above 80 or even 90 years old.
I am 53 years old now. There are lots of changes in Kiunga. Like the road, before this road was very rough. If it rained, no vehicles could come. The River Mangai was full of water. Now vehicles from Lamu to Kiunga can pass after a bridge was built by the government. We hope after a short time a new road will be built. Water is the problem. Now we have no water. We get the water from the Mangai. Now the government through CDF builds the channels from Mangai to Kiunga. It is now under process to take water from Mangai. They pump the water and store the water in the tank. And then this side will enjoy the water from the tank due to the low altitude here. We have more security, like the KWS, the police and the navy. So more people are coming here, like the Somali and the Kikuyu. The place is expanding. Before this time, we could not see Kikuyu people. But now you can see the tomatoes on the streets. You can see they are selling it. Now we have a healthy center.
The mangroves remain the same, no much changes. The sea is the same, and no problem. The problem is the amount of fish we catch. Before we got more. But now we get 50-100 kilograms. It reduces. This is the problem I see.
On the way from Mkokoni to Kiunga, you can see many kungus. In 1974, on that way you could see many elephants and even sometimes the vehicles couldn't pass. But the Somali poachers killed them for the ivory. Now there is no elephant.
Now we have many buffalos, baboons, and hyenas. The changes are a lot. The changes affected my life a little. I know the new Lamu port. Of course it will affect the environment in Kiunga. It will affect the people here. Many people will get the jobs. And many investors will come. A lot of money will come for the port. Maybe the tourism as well. In the future the changes will be a lot. But now a little. I haven't noticed the plan from the government. Now I am an old man, and I have the hope that my children can work for the port. I cannot work for it. We worried about the outsiders. Sometime the work will need the grade or the diploma. There are very few of our people got that level. So that jobs must go to the outsiders. We want the jobs to be given to the local. When the ads come out, they will tell you the vacancy, and the requirements of maybe level B, or having a certificate or diploma. So most of the jobs will be taken by the outsiders. It is a long term thing. Now it is time to work and we don't have enough time to train the people. I heard the Lamu Port for a

long time, even since the colonial time. It was an old plan. That is why people long for it. And now people say finally the dream come true. Now everybody is looking forward to the benefits of the port. Before the port, there are many people have HIV. But people here don't agree that he/she has the disease. The one who has it say I am suffering from blood pressure and other diseases. Of course every district has STI diseases. People will say we don't have, but they have. If the people won't care about it, more people will have. If people care about themselves, it will be controlled. If you drink, it is very hard to change. People should go to test. Those who have should use the medicine. And they should control themselves. They cannot be crazy that they want to die with more people. Those who have no disease should care about themselves. The port will affect the land in Kiunga. The government should give the owner of the land some money and other land to move to. I will move if the compensation is good. I think these days it is not easy for the government to move people without any compensation. I think the people have to move because the government is the power anyway. It won't affect the culture here. The port is just the development of the county. It doesn't mean that the religion will be changed. Everyone has got his religion and his warship. There are some meetings about the port. We tell the people that the local will benefit from the port. A lot of meetings. We have four meetings with the chief every month. We invite the whole community to join the meetings. Maybe 200-300 people joined the meetings. We are also telling them the possible bad impacts after the port. For example, once most of the fish died in the sea. People were told by the government that they should not go fishing in two weeks. So the fishermen had many problems. They had no food and no income. Because when they have the money they will use all the money in one day. They say tomorrow they can go again. The fishermen should think the other way of making a living if they cannot go fishing any more in future. It is themselves should think about it. It is very bad to depend only on one way. For the good impacts, I choose all of them. For the bad impacts, I choose ACD.

Appendix 8: Interactions between policy regime, actors, renewable technology and niche novelties in Kenya from 1954 to 2016

Year	Policy Regime	Actors	Renewable Technology	Niche Novelties
1954		Kenya Power Company was formed; British Commonwealth Geological Liaison Office in charge	Geothermal	Early investigations on geothermal resource in Olkaria region
1982	**Geothermal Resources Act** By the Parliament of Kenya (PoK)		Control exploitation of geothermal, vest the resources in GoK.	Geothermal Olkaria I (30 MW in 1981 and 30 MW in 1985).
1991 ~1994	**Aid embargo** imposed on Kenya, for reasons linked to corruption and lack of advancement in the creation of a multi-party state, which affected all sectors, including power.			
1995	**Economic Reforms for 1996-1998: Policy Framework Paper** By GoK, with IMF and WBG / Separate the regulatory and commercial functions of the power sector, facilitate restructuring, and promote private sector investment. / Separate the generation, transmission and distribution by reforming KPLC. / Invite bids for investment by Independent Power Producers (IPPs) in generation.	/ Kenya Electricity Generating Company (KenGen) in 1997; Electricity Regulatory Board (ERB) in 1998; A succession of IPPs. /KPLC was renamed as Kenya Power in 2011.	Review cost-effective options for providing electricity to rural areas, including policies to encourage the use of renewable resources, like wood fuels, photo voltaic and windmills.	/ In 1995, tenders for the first two IPPs by MoE: one diesel (Tsavo), the second geothermal (OrPower4). / In 1998, OrPower4 PPA signed for between 28 and 100 MW. Tsavo PPA signed for 75 MW. / In 2000, OrPower4 began to operate 9 MW and added additional 4 MW for a total of 13 MW later.
1997	**Electric Power Act** By PoK / "Electric power production license" means a license granted to a public or local authority, company, person or body of persons, referred to as an electric power producer, to generate and supply electrical energy to other electric power producers or public electricity suppliers. / Establish an independent regulator to regulate the electric power.			
1999	**Environmental Management and Co-ordination Act** By the PoK / Regulate the environmental aspect of the energy sector			
1993 ~2003	/ The **depreciation of Kenyan Shilling** weighs heavily on GoK, considering all PPAs are denominated in US dollars (USD). The Kenyan Shilling against USD reached a historical record low of 36.23 in 1993, and was about 80 in 2003. / **Severe drought** in 1995/96, and 1998/2000, with 4 million people in need of food assistance in 2000 (Kenyan total population of 31 million). Three emergency IPPs were introduced during drought (Aggreko, Cummins and Deutz).			

Year	Policy Regime	Actors	Renewable Technology	Niche Novelties
2004	**Sessional Paper No.4 on Energy** By Ministry of Energy (MoE) / Create REA to accelerate the pace of rural electrification. / Establish GDC to undertake an assessment of geothermal resources. / Dissolve the ERB and create a new energy sector regulator. / Create an appeals tribunal to deal with complaints against ERC's decisions. / Partially privatize KenGen through an Initial Public Offering (IPO). / Unbundle KPLC into two entities, one for transmission which is a 100% state owned and the other for distribution which will be private sector owned. / Allow power generation companies to access bulk electricity consumers. / Create a domestic power pool with a provision for wholesale and retail markets.	/ In 2006: Rural Electrification Authority (REA); Energy Regulatory Commission (ERC); KenGen was listed on the Nairobi Securities Exchange after GoK sold 30% of its stake through IPO. / In 2007: Energy Tribunal (ET). / In 2008, Geothermal Development Company (GDC); Kenya Electricity Transmission Company (KETRACO).	/ Promote electricity generation from renewable. / Promote privately or community owned vertically integrated entities either operating renewable power plants or hybrid systems, to coexist with licensed electricity distributors. / Ten-year tax holiday for renewable power plants. / Renewable pricing will be determined by the market forces of demand and supply.	/ In 2003, geothermal Olkaria II with 70 MW, and extended another 35 in 2010.
2006	**Energy Act** By PoK / Consolidate all laws related to energy, and provide legal framework for REA, ERC, and ET.			
	Electric Power (Electrical Installation Work) Rules By ERC / Set requirements for the licensing of electricians and electrical contractors.			
2008	**Kenya Vision 2030** By GoK / A long-term development blueprint.		/ FiT policy covered wind, small hydro and biomass sources, for plants with capacities less than 50 MW, 10 MW, and 40 MW respectively.	
	Feed-in-Tariff (FiT) Policy (revised in 2010, and 2012) By MoE / An instrument for promoting renewable electricity, allowing power producers to sell renewable electricity to Off-takers at a pre-determined tariff for a given period of time.			
	Electricity Grid Code (under discussion as of April 2016) By ERC / As the primary technical document of the electricity supply industry (ESI).			
2009	**Least Cost Power Development Plan (LCPDP) 2011-2031** By GoK / Identifies existing potential in generation, possible investments in transmission, forecasts future power demand and how best it can be met at least cost. / Policy target: multiple renewable sources, geothermal, wind, hydropower / Forecasted peak demand for 2031 is 15,026 MW, 13 times of the 2011 peak load.		/ Geothermal is the least-cost choice, with capacity target 5.5 GW, 26% of peak demand by 2031. / Wind and hydro power plants will provide 9% and 5%.	/ OrPower4 expanded another 36 MW.

Year	Policy Regime	Actors	Renewable Technology	Niche Novelties
2010	**Constitution of Kenya** By PoK / A two tier structure of government, the National and the County Governments. It is necessary to review and align the energy sector policy.		/ FiT policy included geothermal, biogas and solar. / Benefit from carbon markets by RE promotion. / Introduce Standardized PPA (up to 10 MW).	
	National Climate Change Response Strategy By GoK / First of this kind to addressing the threats posed by climate change as well as taking advantage of any opportunities that may arise.	National Climate Change Steering Committee		
2012	**National Climate Change Action Plan 2013-2017** By GoK / Zero rated the import duty on RE technologies and removed VAT on equipment and components.	/ Low carbon climate resilient development	/ increase reliability of the electricity supply by reducing reliance on hydropower.	/ Geothermal Olkaria IV with 140 MW in 2012.
2013	**Public Private Partnership (PPP) Act** By PoK / PPP Regulation in 2009. In 2012, GOK received a credit from WBG for the Infrastructure Finance and PPP (IFPPP) Project. PPP Bill was published in 2012.			/ OrPower4 expanded another 36 MW, another 26 MW in 2014.
2015	**Energy Bill** By PoK / A specific obligation on GoK to "facilitate the provision of affordable energy services to all persons in Kenya".	/ Establish an inter-ministerial Renewable Energy Resources Advisory Committee (RERAC). / Transform the REA into National Electrification and Renewable Energy Authority (NERA) to lead the development of renewable other than geothermal and large hydro.	/ Significant proposals relating to policy formulation for renewable in the draft National Energy Policy.	/ 11 IPPs are in operation, representing 30% of installed capacity by June 2016. / Lake Turkana Wind Project started construction, with 310 MW ready in 2017.
2016	**National Energy Policy** (since 2012, final draft in 2016) By MoE / Set up a Consolidated Energy Fund. / Competition generally means in the generation of electricity. The transportation (transmission and distribution) as well as system operation functions are natural monopolies.		/ Encourage investment in geothermal to achieve 5,500 MW by 2030. / Develop renewable energy master plan.	/ OrPower4 expanded another 29 MW. / KenGen had a contract to drill two wells for Akiira Geothermal Project in Olkaria.
	Kenya National Adaptation Plan 2015-2030 By GoK / Demonstrates Kenya's commitment to the Paris Agreement / Kenya's first plan on adaptation		/ Increase the solar, wind network to provide power to off-grid areas.	

Source: author's compilation based on the official documents of legislation and regulation enacted in Kenya.

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