

Repository Africa in the Evolving 'Chinese Century': The Uneven Sino-Nigerian Water Conservation Partnership

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Repository Africa in the Evolving “Chinese Century”: The Uneven Sino–Nigerian Water Conservation Partnership

Adebusuyi Isaac ADENIRAN

Abstract: Although extant reconstruction of the limits of international development practice has been implicated in the budding involvement of China in Africa, debates on China’s actual intents and prospects have continued to rage. Engaging an exploratory design and a political-ecology approach, which affirms the significance of human factors in contextualising, structuring, and contesting the natural world, this study assesses specific short-term and long-term outcomes of China’s Gansu-modelled water conservation project in Kano, Nigeria. The shared ecological interface between China and Nigeria has facilitated transfer of relevant technology to the Guinea and Sahel regions in Northern Nigeria. Chinese involvement in the Nigerian water/agricultural sector has resulted in improved indigenous farmers’ skills, yields, and incomes. Sustaining the trend of ongoing intervention would imply a significant boost to Nigeria’s drive towards self-reliance, though a long-term cleavage towards such Chinese interventions might eventually imply neo-dependency.

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Introduction and Background to the Research

As Chinese aid (and investment) in the water/agricultural sector of the African economy has boomed, its focus, contents, and actual outcomes have continued to attract mixed reactions. One school of thought has held that it represents a sustainable boon to the African drive towards economic prosperity – for instance, the usefulness of engrained foreign direct investment (FDI) in stimulating employment and engendering poverty alleviation (Adeniran 2014: 285; Egbula and Zheng 2011; Mohan and Kale 2007; Obiorah 2007). Another school of thought, though, has opined that such transnational involvement in the productive sector of the African economy could only serve to entrench unhealthy practices such as labour exploitation, environmental degradation and, ultimately, the crowding out of indigenous participants (Mthembu-Salter 2009).

The Chinese water conservation project in Kano, Nigeria, underwritten by the government of China in partnership with the United Nations, focuses on sharing best practices in water management by using the knowledge gained from similar anti-desertification feats in Gansu, Northwest China. The current project in Nigeria involves the entire Guinea and Sudan Sahel zones of Kano State – an area that has been ravaged by climate change, excessive grazing, drought, poverty and, indeed, violence as a result of the relative activeness of Boko Haram insurgents within the region. The ongoing agricultural/water conservation project has remained laudable because it has facilitated the transfer of imperative skills to the indigenous farming populace within the zone. Water conservation in this regard has entailed a reduction in water usage for agricultural activities:

The 10-hectare research base is part of an African aid project jointly sponsored by Gansu Desert Control Research Institute (GDCRI) and the Xinjiang Institute of Ecology and Geography of the Chinese Academy of Sciences [...] to nurture shelterbelts and foster sand-related industries to restore local ecology and boost economic growth. (Liu 2011: 1)

“The achievements of China are very encouraging because many of the successful projects are launched in the country’s poorest areas with low technology,” according to Monique Barbut, secretary-general of the United Nations Convention to Combat Desertification

(UNCCD), who has encouraged other regions and countries that are ravaged by sand and dust in Africa, the Middle East, and Latin America to adopt the Chinese model (*China Daily* 2017).

With the ongoing experimental project in Kano, all participating farmers are being equipped with useful techniques to enhance their skills; this, of course, has attendant impacts on improved livelihood outcomes for individuals and communities. Indeed, management of sand dunes through the platform of the Gansu experimental project has had a remarkable impact on land management and has also led to an improvement in water management through reducing pollution and health risks and lowering water costs. However, despite obvious benefits accruable from the ongoing interventionist project in Kano, this study has not lost focus on how related new techniques could spur unanticipated environmental challenges, such as land degradation, which are potentially of immense concern vis-à-vis individuals’ quality of life and, of course, agricultural outputs within the host communities. The extent of surface run-off and the increase in soil salt content as a result of the new technologies being engaged in the management of sand dunes is of major concern in this study. As surmised in the Federal Government of Nigeria’s report *Combating Desertification and Mitigating the Effects of Drought in Nigeria*, which was submitted to the UNCCD in March 2005,

the problems of desertification in Nigeria are now being addressed in a holistic manner to ensure that the semi-arid zone continues to support human and natural resources. (Federal Government of Nigeria 2005)

All efforts in this regard have been situated within the frameworks of the experimental projects in the Guinea and Sahel zones in Northern Nigeria.

Aside from assessing engrained, short-term poverty reduction and related economic benefits of the project and, indeed, its specific environmental shortcomings, the research also takes a holistic look at the long-term implications of such a donor–recipient partnership, especially in light of the strategic positions of both China and Nigeria as the most populous and biggest economies in their respective regions. The significance of Chinese water/agricultural conservation projects in Nigeria as channels for enabling both short-term economic growth and long-term self-reliance in the country – in Africa, indeed – is explored. The outcomes of this study can be

employed to conclude that the linkage between international aid (and foreign investment), economic growth, and human development is non-linear. While international development flows and economic growth could enhance the possibilities for creating a stable social space, a stable social space could in turn serve as a prerequisite for engendering sustainable human development.

The paper begins with an explanation of its theoretical framework, in which the study's specificities are situated, and its methodology, which explains the study's research design. Thereafter, the gap that necessitated Chinese intervention in the Nigerian water/agricultural sector will be contextualised, presenting a justification for China's presence in Nigeria and elsewhere in Africa. Then, the processes and outcomes of the Kano–Gansu case study will be explored, utilising relevant empirical evidence to demonstrate the ongoing usefulness of China in the expansion of the productive sector of the Nigerian economy and the African economy as a whole. Finally, I end with a discussion of findings, which provides a contextual operationalisation of the study's outcomes, and contribute concluding comments, which encompasses a synopsis of the research as a whole.

Theoretical Framework

The study's specificities adhere to the dictates of the political-ecology approach, which seeks to analyse the interplay of political, social, and economic forces in relation to associated environmental changes (Bryant 1997). As a matter of routine, the human component is projected as being pivotal to the construction, management, and contestation of engrained processes.

Similar factors have been implicated in the respective deforestation challenges of Gansu, China, and Kano, Nigeria. Increasing human population in both places has led to burgeoning human activities on land and water, such as unbridled grazing and farming. It is on this basis that the approach that has been successfully employed in the desertification project in Gansu presents a workable remedy to the problem of desert encroachment within the Guinea and Sahel zones of Kano. As observable in Bryant and Bailey's political-ecology typology (1997: 28), costs and benefits associated with environmental change are unevenly distributed. Since changes in the environment

impact each society differently, varying political, social, and economic processes would account for the inherently uneven distribution of costs and benefits.

According to Bryant and Bailey, such unequal distribution inevitably reinforces or reduces existing social and economic inequalities. Within the prism of this assumption, political ecology runs into inherent political economies as “any change in environmental conditions must affect the political and economic status quo” (Bryant and Bailey 1997: 28). Also, it is suggested that the unequal distribution of costs and benefits and the reinforcement or reduction of pre-existing inequalities across societies would imply political outcomes. Meanwhile, the case at hand presents an interesting scenario wherein China and Nigeria seem to possess a shared ecological interface that has made transnational transfer of desertification technology easily adaptable.

With both critical and constructive capabilities of political ecology in the interplay of the environment and political, economic, and social factors, Robbins (2004: 12) asserts that the approach has a “normative understanding that there are very likely better, less coercive, less exploitative, and more sustainable ways of doing things.” From this standpoint, the approach has proven relevant in understanding how to

- inform policymaking and other organisations of the complexities of environment and development within the Guinea and Sahel zones of Kano, Nigeria, contributing to better environmental governance;
- analyse the decisions that communities within the zones might make about the natural environment in the context of their political environment, economic pressure, and societal regulations; and
- explore the outcomes of unequal political/social relations within the zones in respect to the natural environment, especially in the context of governmental policy projection and implementation.

With both Nigeria and China exhibiting a pre-existing ecological interface between an encroaching desert zone (in the Guinea/Sahel and Gansu/Kubuqi zones, respectively) and wetter zones that are more prone to sedentary agriculture (in the countries’ southern and south-eastern regions, respectively), the practicality of a shared transnational

ecological interface has been worthwhile, actually facilitating a form of technology transfer based on a similar pattern of ecology, hence also facilitating a translatability in the politics of a particular kind of ecological management. As suggested by Liu (2011), the feasibility of the Gansu-modelled experimental project in Kano, Nigeria has, indeed, enabled the project to be replicated in several other desert-prone countries in Africa – namely, Kenya, Egypt, Algeria, and Niger.

Methodology

The study design has derived impetus from similar procedures that were employed in desertification-control investigations led by Liu (2011) in Kano, Northern Nigeria, and in the Hexi Corridor, Gansu, China, within the frameworks of the Institute of Physics (IOP) Conference Series: Earth and Environmental Science (2017). In the case of Liu-led project, both Chinese and Nigerian researchers at their research base in Kano have carried out forestation experiments and desertification-control operations to nurture shelterbelts, foster restoration of the local ecology, and boost economic growth. However, the focus in the case of IOP-led investigation was an analysis of the distribution and stability mechanisms of sand dunes in the Hexi desert area of Gansu Province.

Being reflexive research that transcends disciplinary boundaries, drawing on a variety of concepts and methodological tools, the study employs a qualitative approach, which combines using case studies, in-depth interviews (IDI), and focus group discussions (FGD) to collect primary data. The case studies engaged eight key community leaders: two female and two male community leaders in Kunchi, Kano, and two female and two male community leaders in Dambatta, Kano. First-hand information on the impacts of the experimental desert-control project were obtained through these eight case studies. The IDIs were conducted to gather individual farmers' accounts of the benefits of the interventionist project within their communities. Twenty IDIs (which involved five male and five female participants in each Kunchi and Dambatta) were carried out. Eight FGDs were also conducted, each comprising eight participants, grouped by both gender and age (four women and four men from 18 to 39 years old, and four women and four men at least 40 years), in each Kunchi and Dambatta. The FGDs presented the study with useful group reflec-

tions on the impacts of the experimental projects on the larger communities. Secondary data that probed into existing historical and policy-focused evidence were derived from archival and governmental sources. A purposive-sampling (and snowball-sampling) technique was employed in selecting the research subjects. The case studies, FGDs, and IDIs, carried out in Yoruba and translated in this article by the author, were conducted intermittently between June and December 2015 in the two study locations. Data analysis employed the methods of content analysis and ethnographic summary.

Contextualising the Gap that Necessitated Chinese Intervention in the Nigerian Water/Agricultural Sector

Climate-change outcomes have forced us to rethink and reconstruct the way sustainable human development is projected in Africa. Ensuring food security amidst a changing climate is at the top of developing countries’ agendas. More significantly, issues that affect agricultural productivity and incomes of rural farmers – which would, of course, have implications for the quality of their livelihoods – have made the subject of climate change central to human development discourse. Within resource-dependent contexts, redefining the approach to food security involves embracing change and transformation, including adopting “climate-smart” practices and applying emerging tools and technologies to reclaim drought-stricken agricultural land, which is the specific focus of the Gansu-modelled experimental project in Kano.

By extension, the need to identify new ways of solving problems, making decisions, accessing and processing information, and applying related knowledge to agricultural practices has been deemed imperative in order to achieve more sustainable and profitable agricultural outputs in Africa (Obiorah 2007).

Emerging experiences from the field suggest that irrigation projects that focus on water conservation are playing an increasing role as enablers of change and transformation within vulnerable contexts. Indeed, such projects have proved relevant in mitigating impacts of climate change in especially drought-prone regions. While Africa accounts for more than 60 per cent of all arable land globally, countries on the continent have been spending nearly 50 billion USD

a year on food imports because vast portions of this land have remained uncultivated (Adesina 2013). Of course, ongoing food crises on the continent can be directly linked to this untoward situation. In order to reverse the trend, various African countries are increasingly willing to adopt modern technologies, such as water conservation technology, so as to enhance agricultural output. More than ever, technocrats, government officials, professional farmers, and entrepreneurs in the agribusiness in Africa are advancing the adoption of modern technologies as a strategy to fast-track improved yields in crop and animal production because of the need to feed more people on the continent, more than half of whose one billion inhabitants subsist below the poverty threshold. Thus, agricultural experts, farmers, young innovators, and government officials in Africa are focusing their attention on improvements in agricultural practices that can be brought about by technological innovation, capacity building, and creating policies and infrastructure that facilitate those improvements. Engaging modern technologies for improved agricultural outputs requires funding and technical know-how. China has come to be relevant in these capacities in Nigeria and, by extension, in other sub-Saharan African countries. While Africa presently lacks both funding and know-how, China has them in abundance. African countries want to innovate to spur growth, while China seeks to innovate in Africa basically to support its own enhanced and sustainable growth back home and, of course, to boost its own global relevance.

Evidence on the state of agricultural outputs in Africa is daunting enough to warrant the adoption of modern technologies in the renewed drive on the continent towards food sufficiency. Nigeria's former minister of agriculture, Akinwumi Adesina, noted that Africa is a continent with enormous potential for agricultural growth, yet one where food insecurity and malnutrition are widespread and persistent. According to him,

nearly 850 million of the 7.1 billion people in the world, or one in eight, are hungry [... and] malnutrition is the cause of 4 per cent of deaths in children under five years old; that is 3.1 million children each year. (Adesina 2013)

He observed that while global wealth in 2013 reached a new all-time high of 241 trillion USD, up 68 per cent within the past 10 years, "the challenge is that we are having more poor people despite high

economic growth rates” (Adesina 2013). Today, seven of the 10 fastest-growing economies in the world are in Africa. Much is said about a “rising Africa” on the global economic stage. To be sure, there is a new energy and dynamism across the continent, manifested in an emerging middle class, improved governance, and a heightened interest on the part of foreign investors. But in the thick of this excitement, there remains a disturbing paradox: poverty amidst plenty.

An enduring disconnect has existed between the nature of economic growth, the driving sectors, and the growing number of poor people. Growth in Africa is being driven largely by the oil sector, mineral extraction, telecoms, and financial services.

But we must recognize that over 70 per cent of the world’s poor are in the rural areas and depend on agriculture for their livelihoods. Therefore, to substantially reduce poverty, we must start by transforming the rural economies and the way to do this is to transform agriculture. (Adesina 2013)

As of present, Africa’s agricultural sector growth is essentially pro-poor growth. A 1 per cent growth in the agriculture GDP leads to more than three to four times a reduction in poverty than growth driven by the non-agricultural sector. As further surmised by Adesina, the key is to generate wealth from agriculture and to expand opportunities for millions. In other words, it is beneficial to make the rural economy the new wealth economy through agricultural innovation. What are needed are economic ladders out of poverty. African leadership had, over time, needlessly shifted focus away from developing the rural economy and diverted attention to the development of the urban cities, and “scarce foreign exchange had been spent on importation of food products for the urban areas, to keep price of food down” (Adesina 2013). As such, African countries had unjustifiably become net food importers.

Another major contributor to poor performance of agriculture in Africa has been its having been treated as a development sector: as a way to manage, not eliminate, poverty. It is imperative for actors (development partners, policymakers, and development practitioners) to desist from treating agriculture as a routine development programme rather than as a business. During the 1960s, prior to the discovery of oil in Nigeria, the country was self-sufficient in food production. Nigeria was also a major global producer and exporter of

cocoa, crude palm oil, cotton, and shelled groundnuts. The discovery of crude oil changed the landscape, as the country soon became overdependent on this resource as the driver of its economic growth, export income, and development. Nigeria's dependence on oil entailed an abandonment of the nation's farmers and food processors, with its attendant consequences.

Exploring the Gansu-modelled Case Study in Kano: Processes and Outcomes

The Chinese Gansu-modelled agricultural/irrigation project in Kano focuses on sharing best practices in agriculture by inferring from successes of a similar anti-desertification project already executed in Gansu, Northwest China, as demonstrated below. The experimental project in Nigeria has focused on the Guinea and Sahel regions of Kano: areas that have been battered by erosion, loss of vegetation cover, droughts and desertification following hydro-agricultural activity, and violence as result of Boko Haram activities. It has been conceived to apply techniques pertaining to stabilising sand dunes by using nylon nets and storing rainwater in underground tunnels – for the “sandy days” – to prevent the onset of droughts.

Luoma is a village located in the northern part of Huining County, Gansu Province, China – one of the 592 key impoverished counties in China (IOP Conference Series: Earth and Environmental Science 2017). This village was chosen as one of the pilot rainwater harvest projects in Gansu Province. The annual rainfall here amounts to only 250 millimetres. At the time of the project, there were 65 households in the village, and a total of 323 inhabitants. Before the rainwater harvest project, the annual food production per capita was less than 300 kilograms and the annual income per capita was less than 50 USD. Local people had no water supply for domestic use. The rainwater harvest system consists of a rainwater collection field, tanks for water storage, and water supply and irrigation facilities. Less permeable surfaces of existing structures are used for rainwater collection. The technique used in Gansu involved the use of tanks to harvest water. The tanks are usually bottle-shaped with an average diameter of about three to four metres and a depth of five to six metres; irrigation tanks usually have a capacity of 30 to 50 cubic metres. A concrete, dome-shaped top 10 to 12 centimetres thick

helps to sustain the soil weight and the load on the surface. A hole in the centre acts as both a water outlet and a manhole. The bottom of the tank is made of concrete 10 centimetres thick. The underground tank has the advantages of preventing evaporation loss and maintaining a low temperature, which both help to maintain water quality. Each tank is used for the supplementary irrigation of one Chinese *mu* (approximately 670 square metres). One such structure generates two water applications of approximately 20 millimetres each, enough to mitigate one dry spell during planting season. Water for domestic use is usually supplied by hand pump. The limited amount of rainwater available for irrigation is applied sparingly to crops, using the principle of limited irrigation. This means that water is applied in limited amounts during a few critical periods of crop growth. A lot of experiments have been conducted to determine the best time to provide the different crops in the area with supplemental irrigation. The most commonly used methods are very simple, affordable, and effective: irrigating when the seeds are being planted, or supplying water through holes in plastic sheeting. If farmers can get support or a loan, they also may use drip irrigation and mini-sprinkling techniques for high-value crops.

During the recurring droughts between 1999 and 2000, the rainwater system not only ensured water for domestic use and animal husbandry, but also provided enough water for the supplemental irrigation of 22 hectares of land. Since the project began, annual food production has increased by 144 per cent and income per capita has increased by 187 per cent. Even in years of severe drought, households have enough to meet their food needs.

The feats attained in Gansu have spurred its replication in Kano through the aid of the Chinese government. The Kano project covers a similar-sized landmass but a larger number of inhabitants (three times the number of benefitting households than in Gansu). In terms of climate and vegetation, the project locations have similar features. The Kano project has recorded some achievements, as the team of scientists from China successfully adopted related techniques to assist indigenous farmers in surmounting desertification challenges. As one IDI respondent quipped,

This project has been quite helpful in making sufficient water available for us in taking care of our animals and crops [...].

[...O]f course; I have noticed significant improvement in my incomes. (Anonymous 1 2015)

The resident Chinese scientists have trained selected farmers within the study locations in Kano in improved farming and water conservation techniques, ranging from how to build pillars, set up nylon nets, and then attach both to serve as a bulwark against sliding sand, thus preventing the rise of sand dunes. An experimental zone for desertification projects covering 10 hectares and a climate observation station have been set up within the study locations. In terms of manpower development, 200 indigenous participants have been trained in various aspects of desertification-control mechanisms, ecological restoration, and forestation techniques. According to findings from a series of investigations conducted by Liu (2011), desertification has had a debilitating effect on land resources and, indeed, on livelihoods within the Guinea and Sahel zones of Kano due to a fast-growing population, excessive pasturing, and drought prior to the control intervention. Expectedly, the successes of the intervention in Nigeria have spurred the design and execution of similar interventions in several other desert-prone countries across Africa – for instance, Kenya, Egypt, Algeria, and Niger. Besides desertification control, the Gansu-modelled intervention has also provided training on harnessing solar and wind power, and saving and utilising rainwater for selected beneficiaries within the study locations. Ostensibly, the Gansu-modelled intervention in Kano is deemed to have raised the profile of family farming and smallholder farming, since it focuses on indigenous farmers. Alleviation of poverty and hunger, provision of food security and nutrition, adequate management of natural resources, and sustainable human development have all been enabled by the enhancement of these farmers' incomes. The project has recorded a milestone success through its application of innovative techniques and its training of indigenous farmers in diverse skills in the management of land resources for improved agricultural yields.

As noted by one male research participant,

I can now grow crops all year round; so I do not need to be taking my cows from one place to the other in search of grazing lands [...]. [...A]vailable water is just sufficient since the beginning of this project. (Anonymous 2 2015)

On a general note, it has been observed that capacity building in developing and transition countries is a key prerequisite for improved

agricultural production, local livelihoods, and environmental quality. This can be impactfully achieved through empowerment of rural dwellers. However, most participants in the two study locations in Kano (Kunchi and Dambatta) have continued to depend on small-scale farming procedures, which requires labour and time. A primary precursor in this respect has been the huge capital required to adopt the techniques of the Chinese experimental project at an individual level. In this regard, most of the younger indigenous farmers (those from 20 to 39 years old) within the study locations have been crowded out. As such, they have been engaging in other, non-farming ventures to keep themselves busy.

Meanwhile, the Gansu-modelled project in Kano has been of immense assistance in managing the challenge of sand dunes, which have posed a serious threat to agriculture and, to a considerable extent, to individuals’ quality of life. Small-scale farmers are now benefitting from the application of improved farming techniques as offered by the experimental project. The project’s innovations in the areas of agricultural and water conservation have served the indigenous farmers well.

Just as the case in Gansu, cattles and farming activities are now returning to the locations in Kano with visible improvements in the socio-economic standing of the communities courtesy of the intervention. This development is supported by the findings of research conducted by Olagunju (2015: 195–196) in Nigeria and by Chang et al. (2017) in China.

The political-ecology submission on the propensity of an (external) actor wielding influence over the environment of other actors by means of ancillary expansive methods seems apt here (Bryant 1997: 12). As noted in this approach, power mainly offers an intrinsic platform for “winning the battle of ideas” in relation to human utilisation of the environmental space, wherein a superior existential idea obliterates the place of weaker or inferior ideas (Schmink and Wood 1987: 51).

Meanwhile, evidence of land degradation, which is determined in measures of actual or potential productivity or utility as a result of natural or anthropic factors, abounds within the study areas. A significant proportion of soil within the study’s locations in Kano has been affected by widespread biodiversity loss and land degradation attributable to increasing pressures on land by the growth of crops

for protein-rich diets, biofuels, and biomaterials (Lai 1994). Of course, decreasing water supplies and loss of viable farmland are expected side effects of this. If the arid and semi-arid lands within the limits of the study's locations suffer further degradation, they will become more desert-like. Since lands within the Guinea and Sahel zones are prone to unfavourable weather conditions, largely due to climate change, associated outcomes from the project are increasingly being felt by smallholder farmers. The approaches employed to strengthen local economic developmental efforts and to enhance the adaptive capacity of local farmers, their households, and their communities are to a considerable extent incompatible with sustainable agricultural practices because of high levels of acidity. For instance, the inherent high level of acidity can pose a great danger to productive crop farming and animal husbandry.

However, to the local participants in the Gansu-modelled project in Kano, the negative outcome is of less concern to them, at least for now: "What is the meaning of that [land degradation]? Just focus on the good results that this project has brought to our life" (Anonymous 3 2015).

When the meaning of land degradation was explained to the interviewee above as "decline in land quality or reduction in its productivity, which essentially results from a mismatch between land quality and land use," it was of no significance to him. Within larger FGD sessions (groups of men and groups of women), a similar response was derived from a similar discussion:

This type of problem is meaningless to us because you [the researcher] are the only one that could see the problem. The only thing that we could see is a "better life" as a result of this Chinese assistance. (Anonymous 4 2015)

Does "land degradation" mean good life? This project has been making us self-sufficient in terms of feeding ourselves and animals [...]. [...N]o wandering all around for feeding any longer. (Anonymous 5 2015)

Interestingly, the impacts of land degradation on productivity are easily ameliorated due to the application of additional, soil-enriching supplements and the adoption of improved technology to enhance soil fertility, just as engaged in the conceptual project in Gansu. The application of such improved technology has, as expected, given a sense of security to the various participants within the study's

locations, manifested in increases in farming yields and in farmers' incomes.

This study has observed that, courtesy of the Chinese agricultural skill-transfer project in Kano, the participating indigenes are now able to construct pillars, build nylon nets, and then combine both to serve as a fortification against sliding sand. Hence, a direct correlating link exists not only between the project and improved agricultural outputs but also between the project and poverty alleviation. Significantly, this project has been all-encompassing in terms of skill building, employment stimulation, poverty alleviation and, of course, peace-building.

Until the arrival of these “China people” [the water conservation experts from China], life in this community was quite unbearable. Why do you think that most of our youths have gone to the cities? Because, there has never been any assistance like this from all our governments, from local to state and federal [...]. [...W]e have been neglected all along, until this rescue mission from China. (Anonymous 6 2015)

Across the board, the presence of China in the agricultural sector of the Guinea and Sahel regions of Kano has been embraced by the indigenous farming populace, to the extent that the role of the Nigerian government (the supposed partner in the project) seems largely unrecognised by the local actors. Such transnational presence is generally viewed as mutually beneficial by the host community. It is worth noting that the host community has been unperturbed about any environmental effects the project could eventually engender.

Aside from the immediate recognition and appreciation of the role of China by the host community relative to what governments at various levels in Nigeria have been able to do, related projects are also capable of enabling Nigeria's drive towards self-reliance. To the people actual benefitting, their immediate needs are being met; to the Nigerian policy managers, a critical component of essential policy interventions is being actualised by the project. Putting Nigeria's position as the most populous and biggest economy in Africa and China's position as the most populous and biggest economy in Asia into perspective, the ongoing water conservation/irrigation project has the potential to enable a win-win, South–South partnership. Indeed, unlike the routine master–servant partnership between the

“West” and the “South,” related Chinese interventionist programmes in Africa are anchored on the notion of “inclusive development.”

Discussion of Findings

In this study, I have explored the actual impacts of the Gansu-modelled agricultural/irrigation interventionist project on the local farming/herding populace within the Guinea and Sahel zones of Kano, Nigeria. In so doing, I also examined the specific environmental challenges that the project could portend for the host communities and the long-term role of the project in enabling the Nigerian state’s drive toward self-reliance, especially in its productive sector. On the basis of the research outcomes, I then presented relevant policy recommendations for the purpose of enabling equity and balance in burgeoning China–Africa relations.

It is suggested that various approaches to agricultural/water conservation practices as presented by the Gansu-modelled experimental project in Kano are more likely to succeed if appropriate incentives are given to farmers (especially younger farmers) to modify their practices. Also, an appropriate monitoring and evaluation (M&E) system is necessary to verify the efficiency of related agricultural/water conservation intervention and to share useful information with the indigenous farming populace. Continuous technical guidance and training courses at different levels should be organised for the local farmers. In particular, useful retraining and skill acquisition programmes should be facilitated that will incorporate younger farmers (under 40 years of age) currently uncovered within the framework of the project. Awareness campaigns are crucial for showing the benefits of the project to the indigenous farming communities. The first theoretical goal of this study becomes important here: to inform policymaking and relevant organisations of the complexities surrounding the environment and development within the Guinea and Sahel zones of Kano. Of course, the outcomes of this experimental project have offered adaptable implications for the entire Guinea/Sahel interface. Nevertheless, it has been noted that various indigenous beneficiaries of the project are now capable of constructing defensive outposts against draping sand. Furthermore, groundwater depletion, which has remained a source of concern to the indigenous farmers, has been reduced to a negligible level. All existing institutional

arrangements for irrigation systems and their maintenance have been improved. As a consequence, increased crop yields and incomes for indigenous farmers have been facilitated. In this regard, the second theoretical goal of this study demonstrates its usefulness: to analyse the decisions that communities within the zones make about the natural environment in the context of their political environment, economic pressure, and societal regulations. Meanwhile, the nature of technologies applied in the project have made land degradation inevitable. Younger indigenous farmers, who were apparently crowded out due to their non-coverage in the experimental project (and, of course, as a result of the capital-intensiveness of the techniques), limited the project’s achievements and its expected sustainability. While (an uneven) reduction in household poverty has been noticed, unbridled rural-to-urban migration in the study locations in Nigeria has also been rife. The third theoretical goal of the study – to explore the outcomes of unequal relations within the study locations given the natural environment, especially in the context of governmental policy projection and implementation – is clear here.

Concluding Comments

To guide policy projection stemming from the case study, it is imperative to infer lessons regarding the transmutation of Nigeria (and other African countries) from a “repository” (for Chinese aid, products, and ideas) to a state of self-reliance and sustainable growth and development. Domestication of acquired skills by indigenous project beneficiaries should be facilitated so as to cut undue reliance on Chinese capacity. There is no doubt that this Chinese intervention in Nigeria has offered a platform for Nigeria’s drive towards self-sufficiency, notably in its productive sector. Nevertheless, all pre-existing clogs, such as institutional corruption and project unsustainability, must be efficiently addressed. The process of reducing groundwater depletion, which has remained a source of concern for indigenous farmers, should not only be documented, but also be made available to all prospective indigenous farmers at an affordable price. Specific policies towards the realisation of that should be advanced.

The improvement in institutional arrangements for irrigation systems and their maintenance should not be considered to be a big feat by relevant governmental agencies. Rather, it should be viewed as a fitting platform to make reliable irrigation/water conservation facilities available to indigenous farmers. This will facilitate animal husbandry and crop cultivation as year-round ventures. Ostensibly, improved yields and enhanced incomes for indigenous farmers have been enabled by the irrigation/water conservation project. However, a considerable percentage of the indigenous farmers (especially, the younger farmers) remain uncovered within the framework of the Gansu-modelled project. It should be an all-encompassing venture to guarantee its sustainability.

While the irrigation/water conservation project under investigation here has been useful in improving the quality of the yield and the participating farmers' incomes, the techniques used on the project have made land degradation inevitable. In order to make the project sustainable, relevant authorities in Nigeria should devise means of mitigating such shortcoming without necessarily having to rely on further Chinese expertise. By means of appropriate policy advancement, holistic subsidies should be made available to concerned indigenous farmers by the government for acquisition of capacity and components to adopt the technology. A good justification for such an intervention is the huge amount of capital required to acquire the technology for purposes of domestication.

Essentially, if the outcomes of Chinese participation in the Nigerian, nay African, agricultural sector are to be benchmarked against the immediate impact that they could have on the indigenous farmers' skills, and their yields, incomes, and happiness, then it is all but assured that China will be relevant in this part of the world for a long time to come – conspicuously, to the detriment of the host governments (the supposed partners). Barring the emergence of a “visionary political leadership,” which is presently being inhibited by the increasing local and international demand for immediate economic growth that may not necessarily translate to sustainable human development, Nigeria, and perhaps Africa as a whole, will unavoidably persist in serving as the repository for discarding Chinese aid, products, and ideas, with or without its consent. As such, it was procedurally affirmed that the only role for the African continent in the ensuing “Chinese century” will be that of subservient partner

despite the prospects of synergy and self-reliance that the budding China–Africa relationship offers. This inference is in tandem with the standpoint of the political-ecology approach, which signifies the propriety of power in global environmental interaction and, of course, the supposition of a hybrid of “self-reliance” theory (Emerson 1841) and “economic determinism” theory (Fleischer 1973; Marx and Engels 1848) on the seeming unsustainability of trans-border dependence in the process of driving societal transformation.

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Contents

Political Ecology of a Rising China

Introduction

- May TAN-MULLINS
Dancing to China's Tune: Understanding the Impacts
of a Rising China through the Political-Ecology
Framework 3

Research Articles

- **Adebusuyi Isaac ADENIRAN**
**Repository Africa in the Evolving "Chinese
Century": The Uneven Sino-Nigerian Water
Conservation Partnership 33**
- Meredith J. DEBOOM
Nuclear (Geo)Political Ecologies: A Hybrid
Geography of Chinese Investment in Namibia's
Uranium Sector 53
- Oliver HENSENGERTH
Regionalism, Identity, and Hydropower Dams: The
Chinese-Built Lower Sesan 2 Dam in Cambodia 85
- Shun Deng FAM
China Came, China Built, China Left?: The Sarawakian
Experience with Chinese Dam Building 119

Contributors 159

Article Index 2017 161