2011 Discussion Paper 21

NERICA SEED VERSUS LOCAL LANDRACES: ANOTHER BATTLE OF THE PARADIGMS?

MAIJA HIRVONEN

JUNE 2011

This document is an output from the Research Into Use Programme (RIU) funded by the UK's Department for International Development (DFID) for the benefit of developing countries. The views expressed are not necessarily those of DFID.

NERICA SEED VERSUS LOCAL LANDRACES: ANOTHER BATTLE OF THE PARADIGMS?

Maija Hirvonen[1],[2]

Abstract
Commissioned by the Central Research Team (CRT) of the Research Into Use (RIU) programme, this study was motivated by reports from Zambia of the multiplication of NERICA 4 seed and its distribution in October 2010 to farmers through the Farmer Input Support Programme (FISP). The delivery of NERICA seed coincided with various efforts, including one spearheaded by RIU-Zambia, to purify local rice landraces and extract high quality planting with the view of contributing towards improved yields and capitalising on the overall development potential of the rice sub-sector. The event serves to contrast two distinct approaches towards pursuing productivity gains in a crop of increasing economic importance: the introduction of a new seed variety into the production system versus the purification of widely-used local landraces. This case study documents these two approaches and explores their wider ramifications. It highlights how a 'quick fix' and top-down method of seed multiplication — bearing the hallmarks of a Green Revolution-era paradigm of agricultural development — risks stifling innovation capacity on the ground. It also emphasises the importance for locally-based initiatives to forge effective linkages to national-level policy communities and debates. In their absence, policy risks imposing actions that are out-of-step with grassroots momentum.

Key words: Research Into Use, Agricultural Research, Innovation, Policy, Rice, NERICA, Innovation Capacity, Zambia

JEL Codes: N5, N57, O13, O19, O22, O31, O32, O33, O38, O55, Q13, Q16

RIU DISCUSSION PAPER SERIES

[1] Independent consultant.
[2] I am grateful for the support of the RIU programme, and its Central Research Team. In particular, I would like to acknowledge the assistance of the Zambia country programme coordinator. The views presented here, and any errors, are my own.

TABLE OF CONTENTS

LIST OF ACRONYMS

ACTESA	-	Alliance for Commodity Trade in Eastern and Southern Africa
AGRA	-	Alliance for a Green Revolution in Africa
CAADP	-	Comprehensive Africa Agriculture Development Programme
CARD	-	Coalition for African Rice Development
CGIAR	-	Consultative Group for International Agricultural Research
CIAT	-	International Centre for Tropical Agriculture
COBSI	-	Community-Based Smallholder Irrigation
COMACO	-	Community Market for Conservation
CRT	-	Central Research Team
DFID	-	Department for International Development
EEC	-	European Economic Commission
FAO	-	The United Nations Food and Agriculture Organization
FISP	-	Farmer Input Support Programme
FODIS	-	Food Crop Diversification Support Project
FSP	-	Fertiliser Support Programme
JICA	-	Japan International Cooperation Agency
KIT	-	Royal Tropical Institute (Koninklijk Instituut voor de Tropen)
LINK	-	Learning INnovation Knowledge

MACO	-	Ministry of Agriculture and Cooperatives
MDGs	-	Millennium Development Goals
MTR	-	Medium Term Review
NARS	-	National Agricultural Research System
NERICA	-	New Rice for Africa
NGO	-	Non-Governmental Organisation
NIC	-	National Innovation Coalition
NRDS	-	National Rice Development Strategy
NRTF	-	National Rice Task Force
OPV	-	Open Pollinated Varieties
PaViDIA	-	Participatory Village Development in Isolated Areas
QDS	-	Quality Declared Status
R&D	-	Research and Development
RESCAP	-	Rural Extension Services Capacity Advancement Project
RIU	-	Research Into Use
RNRRS	-	Renewable Natural Resources Research Strategy
S&T	-	Science and Technology
SNV	-	Foundation of Netherlands Volunteers (or Stichting Nederlandse Vrijwilligers in its Dutch acronym)
TICAD	-	Tokyo International Conference on African Development
TR	-	Technical Review
UK	-	United Kingdom

UN	-	United Nations
USA	-	United States of America
ZARI	-	Zambian Agricultural Research Institute
ZCARD	-	Zambia Consortium for Accelerated Rice Development
ZRF	-	Zambia Rice Federation

FOREWORD

This case study was commissioned by the Central Research Team (CRT) of the Research Into Use (RIU) programme — funded by the UK's Department for International Development (DFID). It was motivated by reports from Zambia of the multiplication of NERICA 4 seed[3] and its distribution in October 2010 to farmers through the Farmer Input Support Programme (FISP).

At first glance, what seems to emerge is another case of the 'battle of the paradigms' in agricultural development. The delivery of NERICA seed coincided with various efforts, including one spearheaded by RIU-Zambia, to purify local rice landraces and extract high quality planting with the view of contributing towards improved yields and capitalising on the overall development potential of the sub-sector. Vying for legitimacy was what respondents described as 'a purely scientific view on the bottlenecks to rice development', one which is 'top-down' and which promised 'quick fixes at the expense of building sustainable capacity'. This was pitted against approaches that have pursued the transformation of the sub-sector through more comprehensive outlooks. The RIU-Zambia programme, for instance, has opted to support existing local innovation capacity. It has supported a self-motivated coalition of stakeholders that has articulated research needs, pursued market linkages, strengthened the implementation of regulatory procedures, and improved access to inputs. By the time this initiative started, however, efforts to set rice policy had begun. The task at hand for RIU-Zambia was to ensure that its activities resonated at the high-level policy-making table where rice sub-sector policy was being crafted.

As events have unfolded, the two approaches have increasingly become part of the same actor-network that is driving the development of the sub-sector as a whole.

[3] This report is not intended as a criticism of NERICA rice in particular. In fact, the RIU programme is working with NERICA in Uganda. This report uses the case of NERICA in Zambia as a lens through which to touch on the larger debate around top-down approaches to agricultural development.

Reality, it seems, is proving to be more nuanced than the simplified and exaggerated dichotomy between 'top-down' and 'bottom-up'.

The case study is based on documentary analysis and semi-structured interviews with representatives of nine organisations, spanning government research, policy-making and regulatory bodies, development partners, agri-industry as well as farmers' interest group. The interviews were coded to ensure respondent anonymity. They were held in Kasama and Lusaka between January 17 and 21, 2011.

1. INTRODUCTION

Demand for rice in sub-Saharan Africa is said to be increasing at a rapid rate: the growth in rice consumption is outpacing that of other major staple crops across the continent, and the expansion is detectable beyond the traditional rice belt of western Africa. Although parts of the continent are said to hold great potential in terms of land and water availability for developing rice cultivation, current production levels cannot meet the rising demand. Costly imports form a large portion of the rice that is consumed in the region (Larsson et al., 2010).

Zambia is among the countries whose agroecosystems are deemed to show promise for promoting rice production. Here, rice is growing in importance, although it is yet to reach the status of crops such as maize or sorghum. Total rice demand for the 2009/2010 season was estimated to be 63,328 metric tonnes; this contrasts with the total maize demand of 1,548,681 metric tonnes for the same period (MACO, 2010a). Rice is mainly grown by small-scale farmers. An estimated one-third to one-half of the rice harvest may be retained for domestic consumption, while the remainder is destined for international markets (Mufara, 2010). Thus, rice contributes directly to both household food security and incomes.

In October 2010 the Government of Zambia distributed NERICA seed to farmers in the Eastern, Western and Northern Provinces through its Farmer Input Support Programme (FISP) in efforts to encourage more farmers to take up rice cultivation and to promote higher yields among existing rice growers.[4] This was a response to a culmination of factors. Demand for rice was escalating, particularly among urban consumers in Zambia. Growing markets elsewhere in southern Africa, bolstered by policy commitments to promote regional trade in agricultural produce, were providing further impetus to

[4] http://allafrica.com/stories/201010010393.html (last accessed: 21.2.2011)

pursue higher production levels. Finally, a perceived over-reliance on maize as the bedrock of the Zambian agricultural sector was leading to calls for the diversification of the country's food production. Past attempts to improve rice yields in Zambia had faced a range of bottlenecks, among the most critical of which is said to have been the lack of good quality seed. The delivery of NERICA seed through FISP was to redress this.

The event serves to contrast two distinct approaches towards pursuing productivity gains in a crop of increasing economic importance: the introduction of a new seed variety into the production system versus the purification of widely-used local landraces. This case study documents these two approaches and explores their wider ramifications. The analysis must to be qualified: the 2010/2011 season is the first time that NERICA has been distributed through FISP, and, even now, the seed has been delivered on a small-scale. The harvest is expected in April 2011. As such, it remains to be seen how it will fare against local landraces in the rice value chain.

Nonetheless, the account highlights how a 'quick fix' and top-down method of seed multiplication — bearing the hallmarks of a Green Revolution-era paradigm of agricultural development — risks stifling innovation capacity on the ground. It also emphasises the importance for locally-based initiatives to forge effective linkages to national-level policy communities and debates. In their absence, policy risks imposing actions that are out-of-step with grassroots momentum.

2. CONTEXT

The Government of Zambia began to promote rice production in the 1970s. Its efforts were concentrated in the Northern, Luapula, North-Western, Copperbelt, Eastern and Western Provinces. With support from donors, including the European Economic Commission (EEC) and JICA, it operated a vast system of subsidised inputs and dominated research, extension, training, as well as processing and marketing. The tide of liberalisation that swept across the economic sectors of sub-Saharan African countries in the late 1980s and early 1990s had dramatic consequences for farmers in Zambia: instead of receiving seed, fertilisers, chemicals, draught power and other subsidised inputs, as well as having access to a guaranteed market, they were suddenly expected to fend for themselves (Mufara, 2010).

Today, rice cultivation is practiced mainly by small-scale farmers on a semi-commercial basis. The country has a farming population of 1,300,000, of whom approximately 70% are small-scale producers (Mufara, 2010, citing census data from 2000). The majority of these farmers cultivate maize, sorghum, millet and cassava (Mufara, 2010, citing data generated by the Smallholder Enterprise and Marketing Programme from 2003). According to MACO figures for the 2007-2008 growing season, 13,358 farmers grew rice.[5]

In addition to small-scale producers, the rice sub-sector also includes small- to medium-sized processors (individuals, district business associations or farmers' associations), input suppliers and traders. Indeed, 'the pull' for rice development is said to come partly from the processors (interview data)[6], who are not only eyeing domestic, largely urban, high-end markets (mainly large supermarket chains), but also markets elsewhere in the

[5] As cited in presentation given by Patrick Chibbamulilo (Senior Programme Officer; JICA-Zambia) at the Regional Workshop on Rice and Aquaculture for Central, Southern and Eastern Africa. Lusaka, 7-11.2.2011. Available online: *www.researchintouse.com/resources/ext/jica1102-FAQ-workshop.pptx* (last accessed: 21.2.2011)

[6] NEZ1 & NEZ4

region. There are few, if any, large-scale producers and a handful of large processing companies. In terms of large input suppliers, a Chinese company is expected to begin selling rice polishing machinery, while a Japanese company is anticipated to start marketing tractors and processing equipment, specifically at the district level (interview data)[7].

The country's seed supply system is largely informal. Currently, rice production is based on local landraces. There are an estimated 10-12 uncertified rice 'types', named after their centres of production (such as Chama and Mungu), that make up what is generically known as 'supa rice' (*ibid*.).[8] Although these are said to be well-adapted to local agro-ecological environments, their yields are struggling to keep apace with growing demand (*ibid*.).[9] The Ministry of Agriculture and Cooperatives (MACO) estimated that following the 2009-2010 season, the total volume of available rice was 54,088 metric tonnes. This contrasts with the total requirement, which was forecast at 63,328 metric tonnes (MACO, 2010a). The shortfall is currently met by rice imports.

While 'supa rice' responds to consumers' preferences for fragrant rice and to their increasing quest for locally-sourced food that supports the livelihoods of small-scale producers, it is said to be at a disadvantage against imported rice in terms of quality. The rice that is ultimately sold may contain broken, decoloured grains and sand particles (interview data).[10] According to respondents, such quality considerations are beginning to influence consumer choice, marking a gradual move away from price sensitive markets (*ibid*.).[11]

The rest of the region is also witnessing an increase in demand for rice. The Alliance for Commodity Trade in Eastern and Southern Africa (ACTESA) recently signed memoranda

[7] NEZ4 & NEZ9
[8] NEZ6 & NEZ9
[9] NEZ2
[10] NEZ8
[11] NEZ1

of understanding with several organisations to increase rice output and trade in the region.[12] Rice growers in the Northern Province, for instance, have cast their sights on the Democratic Republic of Congo and Mozambique as potential outlets for their produce (*ibid*.).[13]

In the past ten years, the Government of Zambia has taken several measures that indicate its increasing commitment to developing the sub-sector. Rice has been included in the Food Balance Sheet (an indicator of national food requirements) since 2000;[14] the government began to procure rice through the Food Reserve Agency in 2004;[15] and most recently, it has included rice seed in the input packages that it distributes to farmers through FISP.[16]

[12] http://www.actesacomesa.org/index.php?option=com_content&view=article&id=150:actesa-forges-partnerships-to-increase-rice-production-and-trade&catid=1:latest-news (last accessed: 21.2.2011)
[13] NEZ1
[14] Presentation given by Patrick Chibbamulilo (Senior Programme Officer; JICA-Zambia) at the Regional Workshop on Rice and Aquaculture for Central, Southern and Eastern Africa. Lusaka, 7-11.2.2011. Available online: *www.researchintouse.com/resources/ext/jica1102-FAQ-workshop.pptx* (last accessed: 21.2.2011)
[15] *Ibid*.
[16] http://allafrica.com/stories/201010010393.html (last accessed: 21.2.2011)

3. A CHANNEL FOR DELIVERING NERICA 4 SEED: THE FARMER INPUT SUPPORT PROGRAMME (FISP)

With the liberalisation of the agricultural sector, a nascent private sector took over the provision of inputs and services. Many farmers were unaccustomed or unable to pay for chemicals, draught power, transportation, storage and information on farming practices. Instead, they opted for home-grown solutions. The practice of recycling seed, for instance, became commonplace (Mufara, 2010).

By the late 1990s there was growing consensus that a rather abrupt withdrawal of the state and exposure to market forces had left many small-scale farmers unable to secure livelihoods through agriculture. Governments across sub-Saharan Africa responded by reinstituting the delivery of subsidised inputs. In 2002 the Zambian government put in place a Fertiliser Support Programme (FSP), which at first provided fertiliser and maize seed to farmers. Following criticisms of its selection of beneficiaries, the delivery of its input packs as well as its overall management,[17] the initiative was restructured in 2009 into the Farmer Input Support Programme (FISP). The input pack sizes were reduced and 'camp agricultural committees' were introduced to identify the target beneficiaries. These changes were envisioned to improve the operational efficiency of the programme and to reach a wider community of small-scale agricultural producers. Now, in addition to assisting resource poor farmers in accessing fertiliser and seed, the programme sought to promote private sector participation in input delivery (MACO, 2010b).

In the 2010/2011 season FISP distributed 178,000 metric tonnes of fertiliser; 8,790 metric tonnes of maize seed; and, as a new addition, 30 metric tonnes of rice seed (MACO, 2010a). Indeed, although a number of bottlenecks have been identified that are said to prevent the rice sub-sector from realising its full potential — including inadequate post-harvest processing methods and insufficient storage facilities; long

[17] http://allafrica.com/stories/200904030103.html; http://www.ms.dk/sw107185.asp (last accessed: 21.2.2011)

distances to markets and poorly developed infrastructure for the transport of bulk goods; overburdened quality assurance systems and uncoordinated marketing, particularly for export — all respondents cited the lack of quality seed to be the most critical.

As a government programme FISP can only distribute certified seed (interview data);[18] the sole variety of certified rice seed that was available at the start of the 2010/2011 season was NERICA 4.[19] This belongs to a family of upland rice varieties that were developed by crossing two distinct rice species, one from Africa (*Oryza glaberrima*) and the other from Asia (*Oryza sativa*). Spearheaded by Africa Rice, 18 upland varieties of NERICA exist today. There are plans to expand the collection to varieties suitable to irrigated areas and rainfed lowlands. Existing NERICA varieties are said to offer higher yield potential under a range of weather and soil conditions, a shorter growing period, greater resistance to pests and diseases that are endemic to Africa and higher protein content (see Larson et al., 2010 for a summary of the development of NERICA 4).

In Zambia, exploratory research on NERICA rice has been carried out by the Zambian Agricultural Research Institute (ZARI) since 2006 (interview data).[20] Although a number of development partners have invested in the rice sub-sector, the Japan International Cooperation Agency (JICA) was among those most committed (interview data).[21] During the 2008/2009 season, JICA supported on-farm trialling of NERICA 1 and 4 varieties by farmers participating in its PaViDIA project.[22] During the current growing season, such efforts have continued under the Rural Extension Services Capacity Advancement Project (RESCAP). [23] In addition, JICA has carried out its own studies in 2005, 2008 and 2009 in the Northern, Western, Eastern and Luapula Provinces, examining the rice value

[18] NEZ3
[19] NERICA 4 was released as a certified variety in 2009 (interview data; NEZ5). Some respondents claimed that JICA had provided funds for the registration process, but this could not be verified.
[20] NEZ2 & NEZ8
[21] NEZ1, NEZ2, NEZ4, NEZ6, NEZ7, NEZ9,
[22] PaViDIA newsletter; January 2011
[23] *Ibid*.

chain, along with agronomic and other constraints to rice production. In addition to NERICA, the agency also supports technical advice to the Ministry of Agriculture and Cooperatives (MACO), two agricultural development projects (RESCAP and FODIS), two agriculture sector research projects (COBSI and PIAZPAS), alongside non-project support (2KR tractors).[24]

Although a range of NERICA varieties are being evaluated in Zambia, NERICA 4 is said to be the focus of current efforts; experimental surveys in Zambia suggest that it has a higher yield potential against levels of inputs compared to others. The current average yield of rice in Zambia is estimated at 1 metric tonne per hectare. Documentation produced by JICA's FoDiS project in Zambia suggests that NERICA 4 can yield 1.5 metric tonnes per hectare without fertiliser use[25] and up to 4 metric tonnes per hectare under specific management practices and soil fertility conditions[26] (MACO & JICA, 2009). Moreover, early maturation implies that farmers can accelerate production rates.

The distribution of NERICA 4 seed through FISP traces its roots to a grant from JICA to Africa Rice; Africa Rice channelled this support to NARS to multiply NERICA seed and to create domestic stocks (interview data).[27] ZARI received funding in 2009 to procure 2 metric tonnes of NERICA 4 seed from Uganda. Since seed multiplication is not within the remit of ZARI, it sub-contracted a large commercial-scale seed company, ZamSeed, to produce 30 metric tonnes of seed (*ibid*.).[28] This volume was procured by government through ZARI and distributed to 3000 farmers in the Eastern, Northern and Western Provinces through FISP in October 2010.

The cultivation of an upland NERICA variety may entail changes to on-farm practices among many existing rice growers accustomed to farming rice on low-lying floodplains

[24] Refer to footnote 6.
[25] 30 bags x 50 kg
[26] 80 bags x 50 kg
[27] NEZ2, NEZ5
[28] NEZ2, NEZ3 & NEZ6

(*ibid*.).[29] Further, the growth cycles of local landraces is synchronised with the cultivation of other crops, such as maize, groundnuts, millet and beans; the adoption of upland varieties may alter these patterns (*ibid*).[30] On the other hand, NERICA may also appeal to farmers who do not already grow rice, although the government appears to have opted to distribute the NERICA seed in traditional rice growing areas. In these places NERICA could displace local landraces from farmers' fields (*ibid*.).[31] At least in the Northern Province, however, NERICA is said to be grown in four districts, only one of which is an existing rice producing area (*ibid*).[32]

[29] NEZ7 & NEZ8
[30] NEZ6
[31] NEZ6
[32] NEZ2

4. POTENTIAL NERICA SCENARIOS

It remains to be seen whether the yields obtained from experimental plots will be matched under wider scale trialling by farmers and what the response of the rest of the value chain in Zambia will be. The crop will be harvested in April. Respondents estimated that between 1.4 – 1.8% of the total rice output would come from NERICA (*ibid*).[33] By all accounts, the proportion of NERICA rice that will be harvested is likely to be small. Moreover, the JICA grant that was channelled through Africa Rice to ZARI was a one-off contribution. There are no foreseeable signs that there would be a repeat this year.[34]

Unlike the currently favoured local landraces, NERICA 4 is neither aromatic nor long grained and may not immediately appeal to consumer preferences (*ibid*.).[35] Some respondents predicted that NERICA will be popular among those farmers who have sufficient capital to purchase the inputs required for maximum yields (*ibid*.).[36] However, farmers with fewer resources at their disposal may be less enthusiastic; low input conditions may not support the full yield potential of NERICA.

In terms of possible markets, several respondents felt that the NERICA harvest was likely to be purchased by the government as food reserve alongside maize and other staple crops (*ibid*.).[37] In contrast, others pointed out that there has been no consistent reserve policy, and that the government's stance shifts from season to season (*ibid*).[38] It is said

[33] NEZ2, NEZ4, NEZ8 & NEZ9. The 30 metric tonnes of seed were distributed through FIPS to 3000 farmers in October 2010. Each farmer received 10 kg of seed. An average plot size is 0.25 ha, so 750 ha came under cultivation through the FIPS scheme. Each hectare is expected to produce 2 MT of rice. Of the total annual rice output, only a small percentage is expected to come from NERICA: 3000 farmers x 0.25 ha (as per FIPS) x 1 (or 2) T output/ha = 750 metric tonnes – 1500 metric tonnes. This represents between 1.4 – 1.8% of the total volume of rice available following the 2009/2010 season 54 000 metric tonnes
[34] The seed can be collected and reused, since NERICA is an open pollinated variety (OPV).
[35] NEZ2
[36] NEZ4 & NEZ9
[37] NEZ1 & NEZ4
[38] NEZ6 & NEZ9

to purchase staple crops one year — at a higher price than what the market would offer — but expect the private sector to buy the crops the next. Due to a long history of a highly subsidised agricultural sector, there have been few incentives for a strong private sector to emerge; the one that exists is unlikely, with little advance notice, to be able to absorb the volume that is not purchased by the government.

Despite the modest contribution that NERICA rice is expected to make to the overall rice output in Zambia this season, respondents expressed reservations regarding the broader consequences of its introduction for the rice sub-sector. These reservations centred on two factors: the potential marginalisation of local landraces from breeding programmes; and the co-option of seed production by large commercial companies at the expense of small-scale seed producers.

In terms of the former, several respondents recalled that a well-developed rice breeding programme did exist in the NARS in the pre-liberalisation era (*ibid*.).[39] Among others, this maintained the purity of local landraces. With its collapse, and the sustained emphasis given to maize as the country's priority crop, the quality of both seed and marketed grain has been compromised. Farmers, as de facto custodians of rice planting material, have continued to experiment with and exchange local landraces in efforts to maintain yields. Although the purification of local landraces remains a priority for NARS, and is nominally supported by government and development partners, much of current funding is targeted towards assessing the potential of NERICA. The NARS faces several resource constraints and directs current activities according to available investment.

In terms of the latter, respondents recognised the urgent need for good quality rice seed and understood the decision to turn to the commercial-scale private sector to produce the requisite volumes in the immediate term; this sector has the necessary resources to multiply the seed rapidly. There is little business incentive — beyond grant

[39] NEZ2 & NEZ6

support or subsidies — for commercial-scale seed companies to produce open pollinated varieties (OPVs), such as NERICA. Nonetheless, some respondents perceived a risk of seed production becoming further solidified as the remit of commercial-scale enterprises at the expense of small-scale seed producers (*ibid*.).[40] It tends to be the former that can facilitate the costly seed registration process and run farms that comply with regulations for seed production.

[40] NEZ7

5. RIU-ZAMBIA

Initiatives such as RIU-Zambia seek to support innovation capacity and the entrepreneurial impulse of small-scale seed producers and rice farmers. It has opted to build on the momentum that exists 'on the ground' — consumers' preference for, and farmers' existing practice of cultivating, local landraces — to catalyse the development of the rice sub-sector. Among others, it is supporting the purification of local landraces with the view of certifying them; a 'value addition' stage that would also make them eligible for government-supported programmes, such as FISP.

RIU-Zambia began its activities in the spring of 2009 with the intention of employing research outputs to stimulate socio-economic change. It subsequently became a more clearly defined investigative project in its own right on the role of research in such transformative processes and the mechanisms through and circumstances under which research could provide a catalytic effect. At its core is a concern with innovation; not in terms of its conventional reading as 'new technology', but rather as the establishment of new or changes in existing ways of producing and using knowledge. These can emerge through alternative interactions and working routines among and between actors in a knowledge network, as well as new policies and financing mechanisms in support of them (RIU-Zambia, 2010).

Among the resources at the programme's disposal was a Flexibility Fund; an endowment that the team in Zambia could use to respond to unforeseen opportunities for innovation that show an initial, organic momentum and that require an injection of initial support to fully take off. The fund was not earmarked for specific activities that may have been identified during the programme design phase. Rather, its use was at the discretion of the country team at any stage of programme implementation (*ibid*.).

Soon after its inception the programme realised the food security and income benefits that a better balance in supply and demand of 'supa rice' would bring to small-scale rice growers and other actors along the value chain, and the bottlenecks that were preventing the realisation of such a balance. It zeroed in on the Chambesi floodplains, specifically the Chinsali district, in the Northern Province. This was a remote rice growing area that had been host to various agricultural development initiatives. The Chinsali Rice Growers' Association, which had emerged during the course of a past SNV project on the rice value chain in the area, had expressed interest in tapping into profitable urban markets but was struggling on its own to build the necessary linkages between farmers, processors and traders to reach them. Chinsali was also close to the Misamfu research station of ZARI, which had run a breeding programme on rice in the past (*ibid*.).

Drawing on the Flexibility Fund, RIU-Zambia convened a broad spectrum of local stakeholders to identify priority areas for action. This group of actors was partially in place as a result of the previous SNV activities; RIU-Zambia's contribution was to expand the constellation and to provide a forum for deliberating the means through which the existing business impetus could be actualised. The prioritisation exercise reinforced the collective drive to enter new markets and to develop value-added stages to rice production in the locality. In response, RIU-Zambia facilitated access to Community Market for Conservation (COMACO), a social enterprise that had set up a channel for selling organically grown 'supa rice' to supermarkets and other high-end outlets. Through this interaction rice growers in Chinsali were contracted to produce organic 'supa rice' to a guaranteed market. COMACO purchases, processes, brands and delivers the rice to markets at a higher price compared to what past 'middle-men' have offered (interview data).[41]

[41] NEZ6, NEZ7 & NEZ9

Having established these linkages, stakeholders voiced their demand for better quality planting material. COMACO was able to respond to this demand in the immediate term by making available 50 metric tonnes of 'supa rice' to 3000 farmers in the 2010/2011 season (RIU-Zambia 2010; RIU-Zambia website).[42] However, this did not negate the need to find a lasting solution to a challenge that had persisted since the scaling down of NARS breeding programmes. RIU-Zambia, along with the ZARI research station at Misamfu and other partners, embarked upon the purification of local landraces, with the intention of seeking Quality Declared Status (QDS) for the planting material. In addition, the programme plans to establish a seed bank from which local varieties can be released every few years.

The RIU-Zambia programme allocated financial resources from its Flexibility Fund to the rice platform[43] in Chinsali to support the ZARI research station in Misamfu in collecting local landraces from farmers and purifying them. The purification process will take another two seasons, after which the landraces will be certified and released to farmers for multiplication. The RIU-Zambia programme also supports the involvement of local seed certification authorities to ensure that the seed being grown on farmers' fields will comply with regulations for producing certified seed, and that the resulting seed will meet the criteria necessary for 'quality assured status'. This is a lengthy process — obtaining a pure variety can take approximately two years. Moreover, RIU-Zambia is a time-bound effort, based in a particular locality. It must resonate at wider levels in order to ensure a continuation of efforts.

[42] http://www.researchintouse.com/programmes/riu-zambia/riu-zm42innov-riceprod.html (last accessed 21.2.2011)
[43] The formal name of the platform is the Rice Value Chain Forum.

6. DOMESTIC POLITICAL WILL FOR THE DEVELOPMENT OF THE RICE SUB-SECTOR

In Chinsali, RIU-Zambia has succeeded in bringing together representatives of the ZARI Misamfu research station, District Business Associations, District Farmers Associations and other rice producers, and local government (including the district office of MACO), which is responsible for crop levies and land issues. In this way, the sector is gaining systemic features at the local level.

On a national level, the rice sub-sector is also gaining momentum. The combination of a domestic shortfall, the need to diversify agricultural production and the appeal of regional markets has prompted the government to develop a concerted National Rice Development Strategy (NRDS) (*ibid*).[44] This is being formulated by the National Rice Task Force (NRTF), a transient body set up in 2009 by MACO.

The strategy proposes to undertake rice varietal improvement both through research, and through the establishment of a certified production and distribution system involving individual farmers, broader communities and the private sector. It also intends to increase the area under production in rain-fed lowland as well as upland ecologies. The promotion of mini-irrigation schemes and integrated farming practices, alongside various technologies for harvesting, post-harvesting and value addition, is also part of the strategy. It also seeks to expand the availability of business development services, strengthen domestic market linkages and make inroads into cross-border and regional trade for Zambian producers. The strategy also calls for advocacy efforts to put in place a pro-business, pro-smallholder policy environment in order to encourage investment into the sub-sector (NRTF, 2011).

[44] NEZ3 & NEZ4

The NRDS cites the recycling of planting material as a major issue confronting the sub-sector. It proposes to bolster existing efforts in germplasm selection and characterisation, varietal adaptation trials and the multiplication of foundation seed. The strategy also envisions the establishment of a seed distribution network that will encompass certified seed growers and a community-managed seed credit scheme (*ibid*.).

A Zambia Consortium for Accelerated Rice Development (ZCARD) will coordinate the implementation of the NRDS. This would bring together researchers, relevant government departments, seed producers, agro-processors and grain traders, financial and other service providers, regulatory bodies, producers' and traders' associations, NGOs, as well as development partners (*ibid*.)

7. MORE OF THE SAME OR BREAKING RANKS WITH BUSINESS AS USUAL?

The domestic political will to capitalise on the food security and livelihood potential of rice is bolstered by an international community intent on making rice one of the vehicles for the Green Revolution for Africa. This Coalition for African Rice Development (CARD) is a consultative group of bilateral donors and international organisations that, together with rice-producing African countries, aims to double rice production on the continent to 28 million metric tonnes a year by 2018. [45] Launched during the Fourth Tokyo International Conference on African Development (TICAD IV) in 2008, the initiative is spearheaded by the Alliance for a Green Revolution in Africa (AGRA) and JICA. Taking its cue from the Asian Green Revolution, CARD will, among other efforts, promote "yield-enhancing technical packages", stage "large numbers of on-farm demonstration plots aimed at informing farmers of new production technologies", encourage "small and medium-scale water management interventions", introduce "small-scale rice processing equipment", and forge "linkages with existing rice programmes and policy frameworks" include NERICA, CAADP and the Africa Rice Initiative (JICA & AGRA, 2008; p. 4).

Indeed, the development of the NRDS is taking place under the auspices of CARD; Zambia is among the second wave of countries to be a part of the initiative.[46]

Both CARD and the draft NRDS are careful, firstly, to leave open the specific rice varieties through which productivity gains will be pursued; and secondly, to emphasise that varietal improvement and productivity gains are single components of a more comprehensive strategy. Nonetheless, NERICA bears the hallmarks of an institutional culture that sees research and technology as unlocking the livelihood potential of agriculture. Although these are early days still, respondents' first impressions were of 'a

[45] http://www.riceforafrica.org/about-card (last accessed: 21.2.2011)
[46] *Ibid*.

purely scientific view on the bottlenecks to rice development', one which is 'top-down' and which promises 'quick fixes at the expense of building sustainable capacity'.[47] That this will lead to a replication in Africa of the Asian experience (itself the subject of conflict accounts) is far from certain (see, for instance, Larsson et al., 2010).

Initiatives such as RIU and its approach in Zambia offer an alternative tack. Among others, this perspective suggests that while research-derived knowledge and specific technologies have a role to play in socio-economic transformation, they must be stripped of their false tags of universality and instrumentality. With a history of having been generated in isolation, their 'separateness' from the intended contexts of use undermine their relevance for, and *ex post* integration with, society, economy and the environment. The results often fall short of expectations.

Diagnostic approaches that focus on immediate technological constraints fail to capture the historical dimensions of current circumstances, and in doing so, perpetuate 'more of the same' as opposed to setting the course towards alternative practices. Investments continue to flow into "agriculture ministries, agricultural research councils, national agricultural research organisations, and the international research centres of the CGIAR" (LINK, 2009a; p. 3). These "are all well-defined and trusted organisational set-ups that have a track record of utilising large development investments…This is administratively attractive to many large development investors with significant funds to disburse" (*ibid*.). A tightly woven institutional fabric of international science, donors, national governments and bureaucracies, created under the Green Revolution, continues to wield influence and perpetuate a particular cause-and-effect story. Through this lens, the diagnosis is a persistent case of agricultural underdevelopment. The cure: more research.

[47] They contrast this undertaking with reports that local pishori and kilombero rice is spreading rapidly through eastern Africa. The rice shows high yield potential and is already accepted by consumers (interview data; NEZ1).

For example, some respondents traced the current enthusiasm towards NERICA back to 'the technical approach' of JICA. This, they felt, was multiplied by a culture within MACO that is receptive towards such methods. On agricultural issues at least, the two organisations function in tandem: according to one respondent, JICA has opted for a strategy of working through MACO. This is contrast to many other development partners, which, although seeking alignment with sector priorities and the patronage of the line ministry, choose to set up their operations outside of the government structure.

A further challenge is that conventional priority-setting exercises struggle to capture the multifarious nature of agriculture (LINK, 2009b); a mosaic of alternately coinciding or contradictory agendas pursued by distinct 'advocacy coalitions' (Hajer, 1995). Rice development in Zambia, for instance, is expected to bring household-level food security and income generation, alongside more macro-level agricultural diversification and opportunities for regional trade. In the absence of recognising the constellations of actors behind particular agendas and the often differing levels of material or social resources at their disposal, there is a risk that one agenda is privileged at the expense of others.

Collectively, these points call for a shift from simply supplying material inputs in the form of seed, on-farm machinery or irrigation infrastructure to investing in processes as the basis of sectoral change. Intermediation becomes pivotal: the ability to forge new linkages and to make these functional by altering existing or creating new working practices of and between actors to influence policy, markets and the production and use of knowledge. Such activities are at the core of the RIU-Zambia approach. Efforts to put in place a sustainable local rice seed production and supply system has entailed forging effective linkages between a public research institute, local seed growers, extension services and a private sector buyer. The intention is to put in place sustainable business solutions across the entire value chain, as opposed to disseminating initial inputs with the expectation that these will eventually lead to a transformation in practice.

These notions are encapsulated in the 'innovation systems' heuristic. Although the message is resonating in various corners, it is, by all accounts, a challenging concept to put into use. There is, for instance, no dedicated sector agency that alone can oversee these activities. Instead, it entails a "loose and changeable networks of different organisations working together on an evolving set of issues" (LINK, 2009a; p. 3).

8. POST-SCRIPT

In Zambia there are signs that a convergence is taking place between the networks associated with NERICA promotion on the one hand and the purification of local landraces on the other. In December 2009, for instance, a local representative from JICA attended the RIU-Zambia rice platform meeting in Chinsali (interview data).[48]

Indeed, there appears to space for both approaches. The success of NERICA is thought to rest on the local market response, the regional market response and on producers' willingness to adjust to the new farming system. The value chain for local rice, on the other hand, is expected to continue to be driven by rising demand for 'supa' rice, which to date has competed favourably with imported brands. Respondents were reasonably confident that the linkages, which have been created, will continue to support local seed and rice production and that the rising demand will increase small-scale producers' access to improved markets even as RIU-Zambia is expected to be phased out.

Nor was there a sense that the promotion of NERICA would 'wipe out' the efforts that RIU-Zambia had made in promoting local rice production. Instead, various actors within the agricultural sector, including JICA, are thought to be exploring measures to maintain the existing local rice cultivars. These are likely to be operated through ZARI, which is already involved in the RIU-Zambia work on local rice. This may involve extending support to ongoing activities, or going further by purifying additional cultivars in other provinces.

RIU-Zambia has pursued opportunities to influence the current policy debate away from a singular focus on NERICA promotion. Its calls are being heard — actors behind the NERICA-based approach have indicated that NERICA is one of several mechanisms that

[48] NEZ6

can address the prevalent seed quality question in many African countries and that the improvement of local cultivars is also included in draft logframes. Critically, the draft NRDS recognised the RIU-Zambia initiated Rice Stakeholders' Forum as a potential operational structure for implementing the strategy.

Although RIU-Zambia is making inroads into policy debates, it struggles to leave a 'brand mark' in the minds of policy actors. Indeed, the core business of the RIU-Zambia programme — innovation brokering — does not readily lend itself to the kinds of 'product placement' that development projects conventionally engage in to facilitate attribution. [49] Innovation brokerage is a nebulous activity, often initiated by a project, individual or organisation solely dedicated to it: a prime-mover in innovation brokering builds credibility and legitimacy among actors, who may be weary of collective action, by casting aside vested interests. The drawback is that such mediation comes to be seen as missionary work. This is compounded by a tendency within many organisations not to acknowledge an external impetus for positive change; instead, they repackage ideas as their own. This practice might also be seen as the translation of a notion into more familiar vernacular, which may facilitate its appropriation into organisational practice. As a consequence, initiatives such as RIU-Zambia are unlikely to get credit for their work in a conventional sense.

What lessons does this case study offer? The experiences of RIU-Zambia seem to suggest that ownership and sustainability are garnered by building on the momentum that exists on the ground through, for instance, fostering a network of self-interested actors whose agendas may coincide transiently. Moreover, it is only once such a network begins to take shape that genuine need for research can be articulated: stakeholders are motivated to contribute towards progress and to put knowledge into use.

[49] Although see the presentation given by Patrick Chibbamulilo (Senior Programme Officer; JICA-Zambia) at the Regional Workshop on Rice and Aquaculture for Central, Southern and Eastern Africa. Lusaka, 7-11.2.2011. Available online: *www.researchintouse.com/resources/ext/jica1102-FAQ-workshop.pptx* (last accessed: 21.2.2011)

At the same time, the promotion of NERICA emphasises the importance of ensuring that local initiatives reverberate more broadly, particularly at the level of national decision-making. Fostering local innovation capacity is in itself not enough. This must be accompanied by an ability to contribute towards policy debates. RIU-Zambia has a mechanism for linking up to such deliberations through its National Innovation Coalition (NIC), a group of well-placed individuals who are committed to furthering the RIU-Zambia philosophy. By the programme's own account, however, NIC has been less than effective in fulfilling this role.

Instead, alternative conduits for policy-relevant messages have emerged. The newly-formed Zambian Rice Federation (ZRF), which represents actors along the entire rice value chain, is one such channel. The District Rice Growers' Association in Chinsali, a member of the RIU-supported rice platform, is represented by ZRF at the national level. The ZRF is expected to play an important role in the operationalisation of the NRDS (interview data).[50]

Several respondents described this as a watershed moment for the rice sub-sector in Zambia. Although most felt that NERICA has a definite role to play in realising the food security and livelihood potential of rice, the concern was that the balance would be skewed towards an approach that favours externally generated, technological packages as the basis of solutions to agricultural development challenges. Nonetheless, the clear move towards supporting the rice sub-sector is an opportunity to make the case for the development of local landraces. Indeed, the two approaches are increasingly seen as complementing each other. The story will unfold in the upcoming few months. The NRDS is due to be finalised during the first quarter of 2011, and the rice harvest is expected in April.

[50] NEZ4, NEZ6 & NEZ7

REFERENCES

Hajer, M. (1995) *The politics of environmental discourse: Ecological modernisation and the policy process*. Oxford: Oxford University Press.

JICA & AGRA (2008) "Coalition for African Rice Development". Available: http://www.jica.go.jp/english/operations/thematic_issues/agricultural/pdf/card_02_en.pdf

Larsson, D.F., Otsuka, K., Kajisa, K., Estudillo, J. & A. Diagne (2010) "Can Africa Replicate Asia's Green Revolution in Rice?" *Policy Research Working Paper No. 5478*. Washington, D.C.: World Bank. Available: www-wds.worldbank.org/servlet/WDSContentServer/.../WPS5478.pdf

LINK (2009a) "Will a time of plenty for agricultural research help to feed the world?" *LINK Look Nov-Dec 2009*. LINK: Hyderabad, India. Available: http://www.innovationstudies.org/index.php?option=com_content&task=section&id=8&Itemid=82

LINK (2009b) "Rethinking investment in agricultural innovation" *LINK Look September 2009*. LINK: Hyderabad, India. Available: http://www.innovationstudies.org/index.php?option=com_content&task=section&id=8&Itemid=82

MACO (2010a) *Statement by the Minister for Agriculture and Cooperatives on the Crop Forecasting Survey for 2009/2010 Agricultural Season and the Food Balance Status for the 2010/2011 Marketing Season*.

MACO (2010b) *Statement by the Minister for Agriculture and Cooperatives on the Farmer Input Support Programme in the year 2010*.

MACO & JICA (2009) "Growing NERICA in Zambia: Upland rice" *FoDiS Information Series*. Available: www.zari.gov.zm/media/growing_nerica_in_zambia_08.06.2010.pdf

Mosse, D. (2005) *Cultivating Development: An ethnography of Aid Policy and Practice*. London, New York: Pluto Press

Mufara, P. (2010) *SNV Zambia Rice Programme: Present and Future*.

NRTF (2011) "Draft Zambia National Rice Development Strategy Document".

RIU-Zambia (2010) *Annual Report for 2009-2010*.
Available:www.researchintouse.com/resources/riu10zm-annualreport0910.pdf

THE RIU DISCUSSION PAPER SERIES
(Available for download at www.researchintouse.com)

2010-01 *Research Into Use: Investigating the Relationship Between Agricultural Research and Innovation*
By Andy Hall, Jeroen Dijkman and Rasheed Sulaiman V.

2010-02 *Bottom-up, Bottom-line: Development-Relevant Enterprises in East Africa and their Significance for Agricultural Innovation*
By Andy Hall, Norman Clark and Andy Frost

2010-03 *Innovation Systems, Economic Systems, Complexity and Development Policy*
By Norman Clark

2010-04 *Putting Research Into Use: A Market Failure Approach*
By Norman Clark and Ian Maudlin

2010-05 *It May Take A Little While..: Insights on Agricultural Research for Innovation and Development in Nigeria*
By Utiang P. Ugbe

2010-06 *Gender and Agricultural Innovation: Revisiting the Debate Through an Innovation Systems Perspective*
By Ann Kingiri

2010-07 *New Organisational and Institutional Vehicles for Managing Innovation in South Asia: Opportunities for Using Research for Technical Change and Social Gain*
By T.S. Vamsidhar Reddy, Andy Hall and Rasheed Sulaiman V.

2010-08 *The Innovation Trajectory of Sleeping Sickness Control in Uganda: Research Knowledge in its Context*
By John Morton

2010-09 *Africa Matters: Emerging Lessons from the RIU Country Programmes*
By Jeroen Dijkman

2010-10 *What Does Innovation Smell Like? A Conceptual Framework for Analysing and Evaluating DFID-RIU Experiments in Brokering Agricultural Innovation and Development*
By Utiang P. Ugbe

2010-11 *Studying Rural Innovation Management: A Framework and Early Findings from RIU in South Asia*
By Rasheed Sulaiman V., Andy Hall, Vamsidhar Reddy T.S. and Kumuda Dorai

2011-12 *Organised Retailing of Fresh Fruit and Vegetables: Opportunities for Putting Research Into Use?*
By Rasheed Sulaiman V., N.J. Kalaivani, Jatinder Handoo, Vamsidhar Reddy T.S., Kumuda Dorai and Andy Hall

2011-13 *Beyond Knowledge Brokerage: An Exploratory Study of Innovation Intermediaries in an Evolving Smallholder Agricultural System in Kenya*
By Catherine W. Kilelu, Laurens Klerkx, Cees Leeuwis and Andy Hall

2011-14 *The When and Where of Research in Agricultural Innovation Trajectories: Evidence and Implications from RIU's South Asia Projects*
By Vamsidhar Reddy, T.S., Andy Hall and Rasheed Sulaiman V.

2011-15 *Dynamics of Biosciences Regulation and Opportunities for Biosciences Innovation in Africa: Exploring Regulatory Policy Brokering*
By Ann Kingiri and Andy Hall

2011-16 *Necessary But Not Sufficient: Information and Communication Technology and its Role in Putting Research Into Use*
By Rasheed Sulaiman V., Andy Hall, N.J. Kalaivani, Kumuda Dorai and Vamsidhar Reddy, T.S.

2011-17 *Functions and Forms of Brokerage in the Malawi Fisheries Platform*
By Elias Madzudzo

2011-18 *Embedding Research-Into-Use Ideas in the Policy Space: The Case of RIU in Nigeria and Sierra Leone*
By Utiang P. Ugbe

2011-19 *Brokering in Practice: The Experiences of the RIU-Malawi Country Programme*
By Maija Hirvonen

2011-20 *Research Into Use: An Institutional History of the RIU-Nigeria Country Programme*
By Maija Hirvonen

2011-21 *NERICA Seed Versus Local Landraces: Another Battle of the Paradigms?*
By Maija Hirvonen