**Evidence-based agricultural policy in Africa:**

**critical reflection on an emergent discourse**

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# Abstract

# Evidence-based policy represents an emergent discourse within African agriculture and is welcomed by many for the emphasis that it places on the legitimisation of policies and strategies through reference to observed realities. Its intuitive premise places realised results, as opposed to theory or bias, at the foundation of policy-making. However the universal appeal of evidence-based policy, as demonstrated by the geographical and inter-sector spread of the discourse, belies the fact that its legitimacy relies on a set of pre-requisites that are by no means universally established. This review paper highlights some of the current incompatibilities between a leaning towards evidence-based policy within African agriculture and a number of issues that currently compromise the quality of national agricultural statistics across the African continent. The case of NERICA rice is used to highlight how ‘success stories’ – which may become an evidence-base of their own, justifying scaled up investments and technology delivery – may be successfully constructed on the basis of weak or incomplete evidence. It is argued that the virtues of evidence-based policy rely critically on the quality of evidence and transparency in the way in which evidence speaks to policy, such that weaknesses do not become lost in a process that distorts data into policy truths.

# Introduction

Low levels of untargeted investment in African agricultural research and extension have continued to limit the growth of the sector. There is growing recognition of the need to invest more wisely by closely linking funding to strategic national-level development plans. Despite divergent ideas about what should be prioritised within African agricultural policy and development strategies, there is general agreement that policy-making should be better informed and more consistent, in response, the discourse of ‘evidence-based policy’ (EBP) has come to take centre stage in African agricultural policy debates. This paper critically considers the EBP discourse within the context of African agricultural policy, focusing specifically on the central role that one particular type of evidence – national-level agricultural statistics – plays in agricultural policy debates and processes. It is apparent that, whilst the weaknesses of and dangers associated with national agricultural statistics in Sub-Saharan Africa (SSA) are universally acknowledged, they continue to play a central role in policy debates, perhaps because they are considered to be the best quantitative evidence available. Problematically, caveats about the limitations of national-level statistics seem to be quickly forgotten or lost within the persuasive narratives of ‘success stories’. It is argued here that the coincidence of evidence-based policy discourse and poor-quality evidence is common, and where the poor quality of evidence is unacknowledged (or not clearly communicated) it threatens both to undermine the interest in evidence-based policy and to legitimize inappropriate policy solutions. There is a need for greater transparency in the systems through which evidence speaks to policy, in order to ensure that weaknesses within evidence bases are communicated and that strategic or selective use of evidence within policy can be identified.

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# Evidence, policy and evidence-based policy

EBP can be seen both as a mechanism and an ideology of objective discovery of policy problems and their best solutions. The international spread of EBP across public policy sectors has been aided by the institutionalisation of technical rationalism in response to demands for risk assessment and

management ([Head, 2008](#_ENREF_14)). As such, the language of ‘evidence-based policy’ has become prominent in debates about climate change, food security, and sustainable development ([IPCC, 2007](#_ENREF_16); [CAADP, 2008](#_ENREF_3); [Haines, 2008](#_ENREF_13); [IFPRI, 2010](#_ENREF_15)). In its various guises and applications, EBP refers not only to policies based on an evaluation of various solutions, but also to those policies which respond to ‘evidence’ about the nature and drivers of the risk itself, and may equally result in the promotion of technological solutions or principles of precaution.

The political and intuitive appeal of EBP comes from its implicit promise of an objective knowing of problems and risks, and an unbiased determination of ‘what works’ ([Roberts, 2005](#_ENREF_25)) in response to them. In effect, EBP promises the depoliticisation of policy. Social constructivist literature has argued, however, that rather than being value-neutral, the production of knowledge and evidence inevitably involves assumptions and value judgements. In a recent study on the use of evidence in agricultural policy, Morton Jerven ([2012](#_ENREF_17)) argues that the fact that “‘data’ are themselves a product of agricultural policies” (p.17), necessitates that relationships between methods of collection and data should be subject to analysis alongside measurements of policy effectiveness based on such data.

In an attempt to reconceptualise EBP and move it away from its objectivist roots, a ‘realist synthesis’ ([Pawson, 2002](#_ENREF_24)) has opened up the idea of evidence to greater scrutiny. This realist synthesis argues that evidence includes not only systematic scientific research, but also knowledge gained through experiences, management practice and processes of reflexive social learning. The result is that EBP gains new legitimacy as a more contextualised and reflexive approach, attempting to determine ‘what works for whom in what circumstances’ ([Pawson, 2002](#_ENREF_24)). A more contextualised agricultural EBP, for example, may draw on local knowledge of agro-ecological (soil types, rainfall distributions, pests and disease etc.) and socio-economic conditions (market access, local livelihoods, etc.), in determining the appropriateness of solutions.

A growing body of literature, including ongoing work by the Research and Policy in International Development at the Overseas Development Institute, highlights some of the conceptual and practical challenges of achieving EBP from this more plural and constructed perspective. Cartwright et al. ([2009](#_ENREF_4)) argue that EBP requires a ‘practicable theory of evidence’ that clearly explains what constitutes evidence (and what does not), the legitimacy of alternative evidences in speaking to policy, and how a hypothesis should be evaluated in light of alternative evidences. The insights of constructivism suggest, in addition, that such a theory should incorporate an understanding of the existence of incomplete knowledge and value-judgements, along with a transparency mechanism by which the constructed nature of evidence is identified and communicated.

# Evidence and policy in African agriculture

*‘... not only is there a need to base food security and structural adjustment policies more firmly on empirical information, but... the process by which the information is obtained is as important as the information itself. Agricultural economists and other social scientists can, and increasingly should, design policy research in Africa in ways that simultaneously increase effective demand for empirical information as an input into the ongoing policy process and augment African capacity continually to inform policy deliberations.’*

 *(*[*Weber et al., 1988: 1044*](#_ENREF_32)*)*

Weber et al.’s vision of ‘empirical evidence informing policy dialogue’ has, until recently, remained largely absent from mainstream policy debates relating to food security and agriculture in Africa. It is only in the last decade, and primarily as a consequence of initiatives supported by US-based donors, that the language of EBP has seeped into the realm of agricultural policy in Africa and a demand for more policy-relevant empirical information has been articulated (IFPRI 2010){IFPRI, 2010 #5;IFPRI, 2010 #5}. The Food and Agriculture Organisation of the United Nations (FAO) has played a prominent role in the extension of EBP to the agricultural sector in the developing world by promoting the systematic collection of data on agricultural production; providing a forum for information and knowledge-sharing; and mobilizing resources and building capacity for the analysis of this information and its integration into policy-making ([FAOStat, 2011](#_ENREF_11)). The extent of this influence can be seen in The New Partnership of Africa’s Development (NEPAD) Comprehensive Africa Agricultural Development Programme (CAADP). CAADP aims to promote sustainable economic growth through agriculture-led development, and is a leading contributor to the EBP discourse, advocating an evidence-based approach to the establishment of national agricultural strategies. The International Food Policy Research Institute (IFPRI), a US-based, Consultative Group on International Agricultural Research (CGIAR) centre that supports the implementation of CAADP, is working to build national capacities for EBP with the vision that national action plans can be designed through a process of ‘evidence-based dialogue which has been completed and reported on by Technical Committees’[[1]](#endnote-1) .

*{Insert table one near here}*

**EBP and National Agricultural Statistics**

National agricultural statistics are at the heart of agricultural policy debates and processes in SSA. The FAO Statistics Division collates and disseminates food and agricultural statistics (crop productivity, area cultivated, yield, imports, exports etc.) generated by national governments, and attempts to standardise data collection methodologies and check data quality. These data can be based on farm surveys, wider national agricultural surveys or censuses and remote sensing ([FAOStat, 2011](#_ENREF_11)). As the examples in Table 1 suggest, national level statistics (area planted, productivity [principally yield/ha] and aggregate production) are commonly used by policy advocates at all levels and of all persuasions. The origins, virtues and limitations of these national-level data are discussed in the following section.

Almost all countries in SSA publish information on production, yield and area harvested on an annual basis for their main crops. These data originate from periodic agricultural censuses or, more commonly, a combination of annual smaller scale surveys that use nationally representative sampling frames (considering geography, demographics and land use), market data, and estimates. In comparison, the agricultural census covers all (or a significantly larger sample of) farming households within a country and it aims to collate a comprehensive and accurate set of basic data (cultivated area, crop types, total production). Whilst some agricultural surveys directly measure production from small plots (crop cutting) and extrapolate, it is more common that both annual surveys and agricultural censuses depend on farmers’ estimates and recall, which inevitably introduces inaccuracies and bias.

Kelly and Donovan (2008) conducted a review of national level agricultural statistics in four countries of sub-Saharan Africa: Mali, Zambia, Mozambique and Rwanda. Their findings suggest that, despite notable and ongoing improvements, a number of shortcomings in data collection methods and strategies compromise the accuracy and reliability of both agricultural production statistics and crop forecasts. More generally, across sub-Saharan African states, the resources and analytical capacity of state-funded statistics divisions often limit the quality, scope and resolution of data gathering initiatives ([FAO, 2008](#_ENREF_10); [Kelly and Donovan, 2008](#_ENREF_18)). In conditions of highly constrained budgets, statistics usually represent a low priority for government spending and in cases where extra finance is injected it is often an ad hoc and short-term intervention aimed at filing a particular gap, rather than being dedicated to long-term capacity building ([Kelly and Donovan, 2008](#_ENREF_18)). Some countries (e.g. Zambia, Mozambique and Kenya) have received support from the FAO and World Bank to conduct regular and detailed policy-oriented agricultural surveys or one-off censuses and financial support has also been provided through a joint initiative by the World Bank and the Bill and Melinda Gates Foundation which saw combined Living Standards Measurements and Agricultural Surveys conducted in six Sub-Saharan African countries. However, Kelly and Donovan (2008) suggest that ‘in most cases the surveys are one-shot affairs covering limited geographic areas and they do not provide the type of panel data needed for longitudinal assessments of household incomes and livelihood strategies’ (p.3). Overall, they find ‘inadequate budgets’ to be the primary determinant of weakness in agricultural statistics systems in sub-Saharan Africa.

Although many problems are the direct result of insufficient financial resources for more extensive surveying and regulation of methodologies, they have often (particularly in past decades) been exacerbated by a lack of consistency and standardisation of definitions and methodological approaches ([FAO, 2004](#_ENREF_8), [2005](#_ENREF_9); [WB, 2010](#_ENREF_31)). Moreover, such problems are often very difficult to identify because the methods are not clearly described and metadata (about levels of uncertainty, what is calculated and what is observed, reference periods, definitions of terms, data sources, etc.) are absent from end-user presentations of data.

Recently, the FAO has focused on standardising methodologies for data collection and monitoring the quality of the data that come through the system; for SSA, this is part of the remit of the statistics division within the FAO Regional Office for Africa. FAOStat is a publicly accessible database that contains, amongst other information, data on the production, area harvested and yields of all the main crop types for all countries and is contributing to an improvement in the transparency of national agricultural statistics. Although many of the issues of data quality persist, and reporting on data quality is far from complete, the database not only contributes towards the potential for better evidence-based policy making, but also creates more opportunity for this process to be scrutinized.

# Promoting ‘success’ on a weak evidence base: the case of NERICA in West Africa

From very early in the development phase, New Rice for Africa (NERICA) was promoted by West Africa Rice Development Association (WARDA, now the AfricaRice Center) and others through a series of oft-repeated and in some cases quite spectacular claims about their technical characteristics (i.e. yield potential, weed competitiveness, stress tolerance and grain protein levels) and about the rate and extent of their dissemination and impacts based on national agricultural statistics. Orr et al ([2008](#_ENREF_23)) concluded that the evidence supporting many of these claims was weak, although this was disputed by Wopereis et al ([2008](#_ENREF_33)). The outcome, however, was that these claims became transformed into hard policy ‘facts’ and were brought together into a powerful narrative that has been and continues to be used to drive rice development policy in Africa[[2]](#endnote-2). Although NERICA is focused on here, similar narratives of ‘evidence-based’ success can be traced in other seed technology projects (e.g. Bt Cotton, Insect Resistant Maize for Africa, Drought Tolerant Maize for Africa, etc.) which collectively speak to the importance of investment in large-scale technological innovation for African agricultural development ([Sumberg, 2005](#_ENREF_28)).

The early experience with the new rice varieties in Guinea, Burkina Faso, and The Gambia, became central to the broader NERICA narrative. The quotations below offer some examples of the use of national agricultural statistics within the NERICA success story:

*“A recent study conducted by researchers from AfricaRice, IRAG and SNPRV in the four regions of Guinea estimated the area under NERICA varieties as 51,000 hectares in 2003, slightly less than 10% of the 525,000 hectares grown to rice in 2003 according to FAO statistics. This is a remarkable achievement in a relatively short time. Moreover in 2007 the area under NERICA varieties in Guinea was estimated at 82,930 hectares corresponding to 12% of the total rice area, with a total production of 145,000 tons (ARI, 2008).” (Diagne et al. 2010: 28)*

*“According to FAO data, from 2001 to 2007, rice growing area [in The Gambia] was relatively constant, i.e. about 17,000 ha. A doubling to 34,000 hectares occurred in 2008, partly due to the enthusiasm generated by NERICA varieties and the support of government and the precious efforts of researchers and technicians. At present NERICA varieties are cultivated in all six agricultural regions of the country. The introduction of the NERICA varieties has brought hope for increased rice productivity and poverty reduction.” (Diagne et al., 2011: 28)*

*"Progress has also been observed in Burkina Faso where domestic rice production increased by an astonishing 241% in 2008 compared to 2007, which was attributed partly to NERICA varietal adoption by the FAO Rice Monitor.... We do not think that it is just a coincidence that Burkina Faso and Mali have had these spectacular successes. They were the first countries to evaluate and release the lowland NERICA varieties developed recently by the Africa Rice Centre in close association with national programs" (*[*AfricaRice, 2007*](#_ENREF_1)*)*

The following graphs illustrate the FAOStat published data on which the above claims rest:

{Insert figure 1 near here}

*Figure 1a. Area of rice harvested (ha), Guinea, 1961 – 2009 (Source: FAOStat)*

*Figure 1b. Total rice production (tonnes), Burkina Faso, 1961 – 2009 (source: FAOStat)*

*Figure 1c. Area of rice harvested (ha), The Gambia, 1961 – 2009 (Source: FAOStat)*

Figure 1a presents FAO data for total rice area harvested in Guinea between 1961 and 2009. The very consistent growth from 1961 through 2000 (at 4.4 percent per year) is striking, as is the trend between 2002 and 2007 (4.76 percent per year). Data quality tags added by the FAO explain that prior to 2000 these data represent ‘FAO estimates’ rather than information that was reported directly by the authorities in Guinea. This situation is not unique as, on average, the national statistics offices of African countries provide just 32 percent of data requested by the FAO (compared for example with 70 percent for Europe) ([Khaira, 2011](#_ENREF_19)). When there is a multi-year absence of data, a growth index may be used to estimate the trajectory from a particular point on the time series. Growth indices are calculated on the basis of data relating to the same commodity, but taken from neighbouring countries, and rely on the assumption that ‘countries in close vicinity to each other are likely to face similar agro-climatic conditions, and therefore the trend of production in these countries could be similar’ ([Khaira, 2011](#_ENREF_19)). This assumption may be necessary to complete a particular time series, but it becomes highly problematic when it forms the baseline against which specific claims in relation to technical change and/or impact are made. Guinea conducted its most recent and comprehensive agricultural census in 2000/01[[3]](#endnote-3), and in this year there was a negative deviation from the trendline of rice area harvested. However, growth in subsequent years, when data were reported from Guinea rather than estimated by the FAO, is apparently based on a 4.76 percent multiplier. As such, it appears that until 2007 the data reported by the Guinea authorities are estimated using similar assumptions to those used earlier by the FAO. The result is that data is based almost entirely on hidden assumptions, seriously compromising its reliability.

Data from FAOStat show that rice production in Burkina Faso has reached and exceeded 200,000 tonnes per annum (Figure 1b). More specifically these data show a period of significant growth in rice production in the early 1990s followed by a decade of stagnation. 2007 was a poor year, but production then increased dramatically in 2008. Total production in 2008 and 2009 was two times the average production between 1994 and 2006. Over the course of this time series, national agricultural censuses were conducted in 1994/95 and 2007/08. It is therefore not surprising that the points of significant change in rice production coincide with the agricultural censuses. An absence of reporting on data collection in the years between the agricultural censuses means that the origin of these data is unknown; however it is likely to have been the product of surveys with smaller sample sizes. Without additional information, however, it is difficult to accurately interpret the trend in rice production. Whilst the large rise in 2008 production may be real, it is also likely that the error margins on the extrapolated estimates from the previous years’ sample surveys were much greater than those associated with the 2007/2008 census data. A lack of reliability in the data preceding the production growth, significantly compromises this legitimacy. It is not possible, for example, to determine the extent to which such an increase in production should be attributed to an improvement in data accuracy as compared to genuine production growth

Figure 1c presents FAO data for total area of rice cultivation in The Gambia from 1961 to 2009. Following the world food price increases of 2007/2008 (and the failed promises of several West African governments to keep domestic prices down), a joint intervention by the FAO, WARDA, international funders, national agricultural research institute and governments, the ‘Emergency Rice Initiative’, supplied rural households in a number of countries, including Burkina Faso (see above) and The Gambia, with rice seed and fertilisers to boost domestic production. Supplied seed included NERICA varieties as well as non-NERICAs; although it is reasonable to assume that this initiative resulted in increased rice production, a lack of disaggregated data means that the attribution of any growth in production to the performance of NERICA varieties is not supported by the available national agricultural statistics. With only one national agricultural census within the time series, agricultural data for The Gambia suffer from the same reliability issues as those in Burkina Faso; however, in this case, the data trend does not deviate around the time of the census. The agricultural census is supported with technical and financial assistance from the FAO, United Nations Development Programme and some NGOs and bilateral donors. The FAO reports that data for harvested area between 2001 and 2004 are estimated (rather than reported) or include aggregated unofficial data ([FAOStat, 2011](#_ENREF_11)), perhaps indicating problems regarding the timeliness of data analysis and reporting following the 2001/02 agricultural census.

## **Drawing on other evidence bases**

Whilst improvements in the quality of national agricultural statistics may be desirable in SSA, and the intentions outlined, for example, in Burkina Faso’s recent ‘Strategy for the Development of Statistics’[[4]](#endnote-4), are much needed and welcomed, capacity limits may mean that improving national statistics do not represent a practicable solution in the short term. However, the use of multiple evidence bases may allow for some degree of triangulation of incomplete evidence and, in some cases present a realistic approach to filling in some of the evidence gaps. Local level case studies, for example, may have particular value in providing contextualised evidence in support of a more pluralistic and forward looking EBP. Such contextualised evidence may be particularly important in the case of rice growing in Africa, due to its reliance on and sensitivity to spatially and temporally variable rainfall. It seems prudent then to look to available village studies in order to better appreciate the extent and dynamics of adoption, performance and impact of technologies such as NERICA.

A review of such research, of which there are relatively few examples, reveals some aspects of the NERICA story that are not evident from the national-level agricultural statistics. Whilst there is undeniable evidence that: adoption rates have been high in certain locations ([Somado *et al.*, 2008](#_ENREF_27); [Diagne *et al.*, 2009](#_ENREF_6)); that there are several properties of NERICA varieties that are beneficial in a number of agro-ecological settings (e.g. early maturing, short-straw, tolerance to water stress) ([Somado *et al.*, 2008](#_ENREF_27); [Tollens *et al.*, 2008](#_ENREF_30); [Rodenburg *et al.*, 2009](#_ENREF_26); [Oikeh *et al.*, 2010](#_ENREF_22)); and that some farmers have realised productivity gains as a result of NERICA adoption ([Agboh-Noameshie *et al.*, 2007](#_ENREF_2); [Diagne *et al.*, 2011](#_ENREF_5); [Dibba, 2011](#_ENREF_7)); yield increases, and other benefits, are variable, and not universally realised ([Tollens *et al.*, 2008](#_ENREF_30); [Kijima *et al.*, 2010](#_ENREF_20); [Kudi, 2011](#_ENREF_21)). Kijima et al. (2010) record high rates of disadoption of NERICA varieties in their panel survey of 347 households in Uganda, citing the ‘low profitability of NERICA relative to alternative crops in variable rainfall areas’ as a major cause. Studies also suggest that evidence for some of the expected, even heralded, properties of NERICA varieties, such as drought-tolerance, remains inconclusive and context-dependant ([Fujii *et al.*, 2005](#_ENREF_12)).

# Conclusions

In their Program and Management Review of the Africa Rice Centre Report, Tollens et al. (2008) warn that:

“For institutions that rely only on donor funds to survive, the temptation is strong to oversell potential products and breakthroughs to donors.... The Panel thinks that WARDA too needs to be cautious with the NERICA story and the way it is sometimes reported, probably by excess enthusiasm.....The temptation to present NERICAs as a solution to all African rice problems risks undermining truly good scientific work and real impact” (p.82).

The danger recognised by the reviewers, is one that must surely be a universal caveat within the EBP discourse, that emerging narratives should be consistent with the realities of the evidence, reflecting the findings of robust data analysis as well as the limitations of the evidence base. In the alternative scenario, in which the narrative takes precedence and looks to weak evidence for support, the legitimacy of the EBP endeavour is seriously compromised. Transparency in the structures through which policy becomes based on evidence are critical both in terms of ensuring that the incentives to use evidence with integrity, rather than strategically, are in place (i.e. through accountability mechanisms), and that weaknesses in the evidence-base do not get smoothed over by the selective use and presentation of evidence.

The NERICA success story is not unique in the way that its momentum and persuasiveness has effectively hidden deficiencies in the evidence base that support it. Similar narrative constructions can be seen in response to other agricultural technologies and innovations as well as agricultural and food policy initiatives ([e.g. Sumberg and Thompson, 2012](#_ENREF_29)), and a broader seed innovations pathway in African agricultural development.

There are some indications that independent of their evidential basis, success stories are becoming an evidence-base in themselves, informing and legitimizing policy in other sectors and locations, as demonstrated by the spread of NERICA across Africa. Tracing the quality of such ‘evidence’ often involves peeling away several layers of analysis and interpretation in order to get back to something akin to original data. This paper has focused particularly on national agricultural data, such as that collected through agricultural surveys, collated by national statistics offices and published in the databases of the FAO. Across Africa, the quality of these data is often compromised by resource and capacity constraints. The quality of evidence within agricultural statistic databases might be improved through investments in building capacity, greater commitment to standardisation and systematic data collection, and more detailed communication of weaknesses in the data. This may go some way to facilitating improved EBP processes around agriculture in Africa, but it is clear that researchers and policy advocates will need to become much more adept at combining a variety of evidence types, inclusive of contextualised studies that draw on local knowledge and the experience of farmers. While movement along these lines is to be welcomed, it does not get around the reality of the contested nature of evidence and the fact that competing political agendas are – and will continue to be – addressed through agricultural policy processes.

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1. CAADP Road map benchmark 5 (March 2008) www.caadp.net [↑](#endnote-ref-1)
2. In addition to driving African rice development policy, the work on NERICA has been publically recognised: in 2000 WARDA was awarded the CGIAR’s King Baudouin Award (<http://www.cgiar.org/newsroom/kingbaudouin.html#warda>) and in 2004 Dr Monty Jones who initiated the NERICA breeding at WARDA was awarded the World Food Prize (Jones 2004). [↑](#endnote-ref-2)
3. Results summary available at: <http://www.fao.org/fileadmin/templates/ess/documents/world_census_of_agriculture/main_results_by_country/Guinea_2000-2001F.pdf> [↑](#endnote-ref-3)
4. Conseil national de la statistique (2010) “Schéma directeur de la statistique du Burkina Faso (2011-2015)” <http://cns.bf/IMG/pdf/sds_2011-2015.pdf> [↑](#endnote-ref-4)