

“Technological choice in a developing country: A focus on nuclear power and genetically-modified foods”

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Contending economic models

The challenge of development in the early 21st century is not always grasped very easily. Part of the problem is the strength of the ‘modernisation’ project, which has dominated thinking about African development since the 1950s, and which was broadly implemented from independence in the 1960s to the present time. In order to interrogate this model we need to ask whether, as the dominant approach to development in the late 20th century, it was at all suitable for Africa’s needs. The reality today is that the model has failed us. According to all statistics, African development has been reversed since the days of the 1960s: investment, production, exports, livelihoods, and life spans have fallen, whilst poverty and disease have grown. This is due to a complex network of factors, including corruption, state failure, the removal of rights, drainage of skills, globalisation, conflict, economic mismanagement, contrary terms of trade, misguided donor aid strategies, imposed structural adjustment, neo-liberal macro-economic policies, and notions of national prestige.

Given our understanding of the many obstacles to development, how do we arrive at what is the most suitable model for development? Although there are numerous models, the intention of this presentation is to highlight the ‘modernisation’ path as the one most treaded, and contrast it against new thinking about a more equitable and just development path.

The ‘modernisation’ model may be summarised as promoting growth at all costs. This meant a minimum of restraints on industry and markets, a depletion of natural and human resources. In relation to the latter, we have seen the model favour jobs that are less protected, dirtier, lower paid and in more recent times, more ‘flexible’ (informal, outsourced, dependent on street or home production, not permanent, not linked to any benefits, often only rewarded for piecework, discouraged from unionising, etc).

There are at least three variants of this model. In the market-based or capitalist variant of modernisation, investment depends entirely on the confidence and whims of the owners of capital, who expect private profit from production. Intensified under conditions of globalisation in the last quarter of the century, there has been a veritable ‘race to the bottom’ in which the developing country offers the investor the lowest wage levels, environmental standards and company taxation.

A second variant, which ultimately failed to deliver, includes a number of state-led industrialisation projects, including import-substitution, state-socialism, and even African socialism (ujamaa) in which the state played the role of investor, and sometimes also the organiser of production, employer and provider of social

services. Despite aspirations for greater equality, this variant was also not immune from the development of social hierarchies, massive pollution, resource depletion, and inefficient production.

A third variant of the model is called 'ecological modernisation', which follows the neo-liberal recipe for development, but instead requires that the environmental services be recognised and internalised in the costs of production. In other words, the variant calls for the marketisation of ecology. We are seeing this in all sorts of ways, the most recent being the carbon trading system.

In contrast to this model, we need to offer as an alternative a new model which advocates eco-social justice. Although there are many different and contending understandings of this concept, the model needs to be based on at least five principles:

- trans-class and inter-generational equity,
- an approach to resource use which respects both the finite nature of many resources and upholds the integrity of the global commons,
- conversion to clean, smart industry with minimisation of waste, pollution, biological extinction and climate change,
- upholding the principles of democratisation, local control, public participation, transparency, and
- guarantees of basic livelihoods for all

In order to achieve these principles, we need a firm regulatory approach in order to raise environmental, health and safety standards, whilst simultaneously our approach to the adoption of technologies which place these goals at risk should be highly precautionary.

On paper, South Africa at any rate is committed to some of these principles. Our constitution endows us with numerous social and environmental rights, whilst our framework environmental legislation (National Environmental Management Act no. 107 of 1998) upholds a number of the principles outlined above and points toward a justice-based approach to development. We have adopted the principles embodied in many of the multilateral environmental agreements of the past two decades, and have ratified these agreements and brought them into domestic legislation.

However, despite these solemn commitments, our economic model is still more in line with historical growth-obsessed modernisation approaches, which have only demonstrated their ability to enrich a few. The practices, plans and expectations of the South African government, constantly articulated by its ministers, appears to have none of the aspirations of realising the principles of development through eco-social justice.

Continued adherence to the modernisation model

This presentation argues that there are three recent technological choices which show conclusively that the current South African government has demonstrated no intention of moving away from the modernisation paradigm. I will introduce these in the form of short case studies, and then assess the impact of each.

Aluminium smelting

South Africa is not a producer of bauxite ore, the raw material from which aluminium is derived. We consume 253 kilotons (2003), yet we have the capacity to produce three times this per year from smelters at Richard's Bay owned by BHP Billiton, one of the world's largest mining companies. What is the reason for our involvement in this industry? Aluminium smelting and production is very energy intensive, and we have one of the cheapest electricity rates in the world, further discounted for bulk users by Eskom. The cost of our electricity is relatively cheap by world standards because we are not including the 'externalities' in the price, i.e. the costs to our health and to our environment. Our coal is extremely low quality, resulting pollution is high, and the rates of respiratory disease in South Africa are very prevalent. Because of our burning of coal, we account for between one and two per cent of the contribution to global warming. We should be moving away from industries which are energy intensive, at least until we are substantial producers of renewable energy. If we look at the situation objectively, we are not so much exporting aluminium as cheap electricity, and the health and environmental costs are being borne, not by Eskom, or BHP Billiton, but by our communities, our health bills and our pollution clean up bills.

What are the impacts of the industry for the country? Firstly, the bulk supply of cheap electricity purely for export helps Eskom to claim an artificial electricity 'shortage', which is being used to justify the reinstatement of previously mothballed thermal (coal) power stations as well as further nuclear capacity (see below). Secondly, we need to note that whilst BHP Billiton and other bulk users have their electricity charges subsidised, such subsidies are not granted at the same levels to those who need it most: new users, generally in townships, informal settlements and rural areas. New users pay higher charges than more traditional users, because their charges include the capital costs involved in extending the infrastructure. The new users find it more difficult to afford the high charges, and as a result face debts, cut-offs, and may resort to illegal connections – often with dangerous consequences.

The current government is seeking to install yet another aluminium smelter, this time located outside Port Elizabeth at the Coega site. The state is trying desperately to promote Coega as an alternative deep-level port, with the smelter forming the basis of the entire development (the 'anchor' tenant). Leaving aside the fact that we do not need an extra deep-level port, that Port Elizabeth is already depressed, that the plans for Coega compromise our environment (especially plans to expand the Addo National Park into a malaria-free big five reserve), and that there is a glut of aluminium on world markets, the Coega project was originally mooted as part of the 'offset' of the highly corrupt arms deal set up by former minister Joe Modise, 'Chippy' Shaikh and others. The offset deal failed, and so apparently has the possibility that Pechiney of France would step in (having been purchased by Alcan of Canada which has continually expressed very little interest in the investment). A third possibility might be SUAL of Russia, through the intervention of its director, Brian Gilbertson, formerly head of BHP Billiton (which has the investment in smelters at Richard's Bay).

The entire Coega development is a potential white elephant. Since its basis is the export of our cheap (and increasingly 'scarce') electricity, how can the project possibly have anything to do with a sustainable approach to jobs and development?

Nuclear reactors

A sustainable energy policy would seek solutions that minimise carbon emissions, decentralise control over generation and distribution, and enhance job creation. Despite claims by the nuclear industry, nuclear energy is not carbon-friendly, especially when one takes the entire life-cycle of this source into account.

Mining, milling, conversion, enrichment, fuel fabrication, energy generation, waste disposal, reprocessing, decontamination, decommissioning, together are said to add around 40 grams of carbon dioxide equivalent per kilowatt generated. This is quite apart from other concerns about the industry: added problems of massive costs, additional radiation risks, transportation dangers, the insoluble problem of waste disposal, the risks of proliferation of weapons of mass destruction, and the difficulties faced in regulating the industry.

These risk factors place a much higher social, political and environmental burden on future generations, since high-level nuclear waste must be isolated from the environment for up to ten times the half-life of plutonium ($10 \times 24,400 = 244,000$ years). If not a technically impossible task, this is certainly a time-scale fraught with unpredictable elements.

We cannot be certain, therefore, that future generations will be insulated from this risk. We cannot know that future political life will be stable such that no leaders will appear wanting to make use of nuclear material for weapons purposes. Having painstakingly sacrificed and won a democratic political dispensation, it cannot be acceptable for us to opt for a technology that requires high levels (and long duration) of secrecy, policing, and the reviving of a culture of undemocratic security procedures.

Nuclear energy also requires a high degree of centralisation of the energy industry, whereas renewables allow for decentralisation and local control.

It is also unacceptable to devote taxpayers' money to the unsustainable development of the Pebble Bed Modular Reactor. This amounts to R1,5 billion to date, including a recently extra amount of R500 million agreed to by the Minister of Finance, and is envisaged to total nearly R15 billion for the pilot plant (and some of the costs of commercialisation) which is planned for the Koeberg site.

The amount of money devoted to the promotion and development of renewable energy sources has been derisory — South Africa was also unable or unwilling to persuade the world at the WSSD to set a target (Brazil had proposed a modest 10%) for renewables in the national energy mix. In other words, the nuclear industry is utilising resources that could be devoted to renewables, which are likely to employ more people in our job-scarce society.

South Africa is also going ahead with the building of the PBMR despite assurances that it would only happen if the project was to attract a significant foreign partner. Potential US investors have withdrawn, leaving only a bankrupt British partner which has yet to provide capital. To date there has been no credible investment by a foreign partner. Despite fantasies of a huge export market, of which there are no signs at all, the PBMR is likely to become another white elephant.

Just as it succeeded in doing under apartheid, the nuclear industry is seeking special privileges from the state. The Environmental Impact Assessment for the

demonstration model of the Pebble Bed reactor was so flawed that even our courts pronounced it unfair when challenged by Earthlife Africa, a civil society watchdog organisation, late last year. Recently the organisation attracted presidential ire for blowing the whistle on an unsafeguarded former calibration site close to Pelindaba. The Minister of Minerals and Energy went so far as to propose legislation to curb scaremongering.

This is nothing new, since by its nature the nuclear industry requires a climate of secrecy, high security, and guarantees that there will be no proliferation of weapons of mass destruction. During apartheid, the industry, along with Armscor, manufactured such weapons. Although they were dismantled on the eve of democracy, our thousand or so bomb makers were never brought before the TRC. Where are they all now? A couple were apprehended recently for trafficking in dual use equipment destined for Libya.

The industry requires that we revert to becoming the national security state that we were during the apartheid years. Do we want that kind of future for our fragile new democracy? Or do we want a set of technologies that promotes more equity in society?

Genetically modified crops

This is another controversial and unsustainable technology which presents high risks and potentially negative impacts on society. The technology is able to splice the genes of one living organism into another of a different species. Principally, the technology has been used to add bacteria with insecticidal properties to food and fibre crops. The risks include potential danger to human and animal health, to biodiversity (the spread of the GM pollen could contaminate indigenous varieties of crops, important to food security), and to the livelihoods especially of small-scale peasant farmers. A highly unacceptable element is the emergence of large biotechnology companies which have increasingly monopolised control over seed and agriculture. Instead of protecting farmers from dependence on large corporations, GM crops require increased dependence on these transnational companies.

The intellectual property laws and international trade regime allows for these companies to patent their 'inventions' — the first time in history that patents have been allowed over life forms. When farmers buy GM seed, they have to sign contracts agreeing not to swap or sell or re-utilize the GM seed after the growing season. This flies in the face of practice over the centuries, when small farmers traditionally would exchange seed with their neighbours, or replant from seed collected during the harvest, in order to find the best variety. With GM, this element of strengthening food security has been eliminated, since the farmer has to return to the company each time she wants to plant a crop. This places huge power over our food chain in the hands of the large biotechnology companies.

Africa has also become a dumping ground for GM food in the form of food aid, provided by the agencies of the US government through UN food schemes. The US subsidises its farmers who plant GM crops, and further purchases from them the surpluses that they generate over and above the needs of the marketplace. The excess food is stored. When the UN appeals for food from surplus countries to

support drought-ravaged regions, the US insists that the recipient countries must accept its GM surplus.

During the droughts of 2002 in Southern Africa, it was discovered that the UN World Food Programme had been distributing GM food aid without informing governments. It announced that countries of the region would starve unless this aid was accepted. Most countries in the region succumbed to this rhetoric, some with the proviso that the GM maize should be milled into flour so that farmers would not be tempted to plant the seed (the US was unwilling to bear the costs of such milling). One country stood out against these offers: Zambia refused to accept the GM food aid, returned the stocks of GM aid that the WFP had introduced, sourced non-GM supplies from other countries in the region and revived the use of non-maize staple foods like cassava, of which there was an excess inside the country.

Zambia argued that because of the potential risks of GM crops, these should not be introduced until there was a fully-fledged and capacitated regulatory system and a set of laws to protect citizens and the environment from the risks of GM. Zambia sent a scientific fact-finding mission around the world to report on the risks; their findings confirmed to the president that the precautionary principle was the soundest scientific option for Zambia.

The decision not to accept GMOs until there is an appropriate biosafety policy and suitable risk-averse legislation is one that stands as an example to the rest of Africa, challenging the attempts of larger powers to use Africa as a dumping ground for a questionable technology. By choosing to honour the organic path to agriculture, Zambia is also continuing to secure its market for fresh vegetables in the EU countries, whose consumers have resisted GM products.

South Africa had adopted the opposite course, succumbing to pressures from the biotechnology transnationals in its eagerness to introduce and promote GM crops. In the past five years, hundreds of thousands of hectares have been turned over to the planting of GM crops, making South Africa the sixth largest producer of GM plants in the world. Our regulatory system is flawed in favour of the GM companies and our authorities have bent over backwards to support the new technology. Small farmers have been supported to plant GM cotton (especially in the Makhatini flats), but are increasingly finding difficulties with debt, low cotton prices, withdrawn extension services and a lack of irrigation.

Requests for access to information from the regulator have been stalled and refused, resulting in legal action by the NGO, Biowatch South Africa, which recently won the right to such information. The secrecy with which the regulator has been giving blanket permission to biotech companies to spread GM seed also flies in the face of the development of our democratic rights-based culture.

The problem also resides in the fact that the regulator resides within the Department of Agriculture, which at the same time is promoting the technology. This poses problems for good governance when the referee sides with one of the opposing teams on the playing field instead of being neutral and objective, and recognizing its duties to protect the public and the environment. Important also to note is the fact that the GMO Act in South Africa was passed without a great deal of public scrutiny, and is out of line with international commitments which South Africa has made in terms of the Convention on Biological Diversity and the Cartagena Protocol on Biosafety. At present the state is considering amendments to the Act, but these are so weak and tentative that they will preserve the status quo if they are accepted as

drafted. Little has been done to inform decision makers and legislators about the risks attached to the technology. Most of all, the technology is not in line with support for sustainable agricultural systems, something to which South Africa's Department of Agriculture is committed to on paper through its Land Care programme.

Conclusions

Achieving ecological and social justice will require substituting the existing model of economic development, and challenging the current commitment to those technologies which violate the basic principles. The evaluation and adoption of technologies will require more rigour to ensure compliance with such principles. Our department of science and technology, instead of endorsing all high-tech options, needs to think about building eco-social principles into its evaluation of technological innovation. We need as a nation to increase public participation in decision making on appropriate technologies for development, including those in which the public has an important stake, such as energy and agriculture.

All parts of public policy – including technological choice – need to be placed in line with such principles. Without this we will constantly be compromising our hard-won democracy and bowing down to short-term gain for the few at the expense of establishing long-term benefits for all.

Further useful information available at davidfig@iafrica.com

- www.earthlife.org.za
- www.earthlife-ct.org.za
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