Summaries

Tropical deforestation: debt-for-nature versus debt-for-development swaps

FABIO ZAGONARI

In this paper I analyze the forest and debt dynamics in a less developed country (LDC), where the former is a renewable resource and the latter increase results from the interests to be paid on the current debt minus the balance of trade surplus. Agricultural and industrial goods are produced, and, whereas the former requires the converted forest as an input, the latter does not. Competitive firms in the industrial sector maximize their current profit by choosing equilibrium labor, whereas competitive firms in the agricultural sector maximize the discounted present value of their cash flow by choosing equilibrium labor and deforestation rate for given cleared land dynamics. Consumers maximize the present value of their utility by choosing the equilibrium consumption levels of industrial and agricultural goods for given debt dynamics. It turns out that the stock of debt infinitely increases without repudiation under very general circumstances, whereas the stock of forest is likely to oscillate around an equilibrium level.

In this context, I investigate the effectiveness and enforceability of the debt-for-nature swaps with respect to forest and debt dynamics. It appears that they always make the debt approach its equilibrium level, however, they may result in the complete depletion of the forest when its initial level is very small. Moreover, only countries with a sufficiently small stock of forest are likely to adhere to the forest management agreement.

There is scope for alternative schemes to be considered. Thus, in the same context, I analyze the effectiveness and enforceability of the debt-for-development swaps with respect to forest and debt dynamics. It appears that for countries characterized by extremely low stock of forest they may prevent its complete depletion in the long-run and they make the debt approach its long-run equilibrium level to a lesser extent than the debt-for-nature swaps. Moreover, all countries are likely to adhere to the development project agreement.

Therefore the conclusion that can be drawn from the present analysis is that the debt-for-nature swaps should be adopted when the less developed

country shows a small stock of forest, whereas the debt-for-development swaps should be agreed upon when the less developed country shows a small stock of debt and a very small stock of forest.

Some empirical evidence confirming these results is provided.

Reducing degradation of forests in poor countries when permanent solutions elude us: what instruments do we really have?

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This paper examines and evaluates potential instruments for reducing demands on forests by smallholder agriculuralists when there is a high degree of interdependence between forests and agricultural systems. Directly addressing the fundamental problems of forest degradation in low-income countries – open access, poverty and population growth – are expected to be difficult, long-term processes. A review of potential interim demand-side instruments is conducted, and it is proposed that in poor countries the menu of feasible measures is extremely limited. Indeed, the set includes mainly subsidies.

The focus of the paper is on subsidy measures to reduce the demand for fuelwood by households in Nepal. Two possible instruments, non-wood fuel subsidies and the promotion of improved cooking technologies, are compared and contrasted using a model of representative Nepalese village agro-forest system. The model results suggest that subsidies for non-wood fuels and improved cooking technologies both reduce deforestation and that the magnitudes to be expected from the use of these tools are roughly similar. On the surface the two policies appear to be equivalent.

Closer examination reveals that important economic efficiency and distributional differences exist. In particular, the economic distortions associated with price policies are predicted to be quite large and such policies also will primarily benefit high-income groups. The subsidy necessary to induce higher-income households to use kerosene, which is the major alternative to fuelwood, is also predicted to be extremely high. It is estimated that it will cost approximately $160 per year to cause one household to switch, which is about 8 per cent of 1994 per capita GNP.

Based on the results of a household survey, improved cooking stoves are found to be reasonably appropriate and quite cheap to promote. Costs per household per year to achieve an average 37 per cent reduction in fuel-

wood use are only slightly more than four dollars; for the same money, promoting improved cookstoves is predicted to save six times more wood than kerosene subsidies. They are also expected to be much more equitable policy instruments, because all income groups have similar incentives to participate.

Cost–utility analysis of schistosomiasis intervention strategies in Kenya

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Kenya is vigorously reclaiming arid, semi-arid, and swampy areas through irrigation and drainage to realize her goal of self-sufficiency in food production. The country has so far been able to utilize only 4 per cent of her irrigation potential, estimated at 540,000 hectares. Kenya has seven large scale irrigation schemes, namely: Mwea (5,799 hectares), Bura (2,010 hectares), Ahero (1,277 hectares), West Kano (900 hectares), Hola (874 hectares), Perkerra (690 hectares), and Bunyala (213 hectares). The study reported in this paper was conducted in the Mwea Irrigation Scheme (MIS) which produces about 78 per cent (i.e., 28,000 tons of rice per year) of the total national rice output. Schistosomiasis is seen by the National Irrigation Board as the main threat to realizing the national goal of self-sufficiency in food production. The prevalence of schistosomiasis increased from 0 per cent in 1956 to over 70 per cent in the 1990s. Thus, the disease has reached epidemic proportions in the scheme.

There has been singular ignorance of the epidemiological environment (EE) of schistosomiasis in Kenya's economic policy; and it is reflected in the lack of national policy to combat this EE hazard. The alleged ignorance by policy-makers might be a manifestation of the inherent failure by economists to conduct substantive research into the fundamental (but complex) links between human health, EE, and various interventions. This gap could be attributed to the difficulty in quantifying the impact of EE change on health (defined in terms of life expectancy and health-related quality of life). There are a number of dilemmas in this regard. Should economists do nothing about measurement of EE change intervention policies costs and health consequences until epidemiologists come up with 'hard' data (preferably from randomized controlled trials) required in decision analyses? Do epidemiologists know the kind of information required by economists? Given the scarcity of research resources in Kenya,

is randomized controlled trial data likely to be forthcoming in the near future? Will the policy-makers in Kenya wait until the 'hard' data required in decision analyses are made available by epidemiological environmentalists for economists to undertake efficiency evaluations? Given that the Delphi technique has been fruitfully used in industry, commerce, and academia in developed countries, can health policy-makers in Kenya do worse (than the current practice where decisions to commit resources are based on 'what we did last time' tempered with 'gut feelings') by using systematic decision analysis based on data from such a technique? Our answer to all the questions is: NO! Since the political and ethical cost of inaction may be enormous, the Schistosomiasis Control Programme (SCP) policy-makers will have to take decisions with or without the guidance from economists. Thus, in this paper, we advocate the use of subjective EE expert judgements regarding health consequences of policies meant to attenuate negative externalities of developmental projects (like the MIS).

This paper develops a cost–utility decision analysis (CUDA) model and applies it (using expert judgements) to map out the most efficient path of interventions across a spectrum of schistosomiasis states – asymptomatic, mild, moderate, severe, and very severe. Strategies involving treatment at the community level were generally superior to non-treatment community strategies. The selective population *praziquantel* chemotherapy (SPCPS) was found to be the optimal strategy. Mollusciciding strategies are the most cost-effective among the non-treatment strategies.