Jatropha: from an iconic biofuel crop to a green-policy parasite

IN LESS THAN A DECADE, a very promising renewable energy source went from being a top policy priority to experiencing 'an extraordinary collapse'. How could that happen, and what can policy makers learn from this short history?

Prior to 2007, *Jatropha curcas Linn.* was promoted as a miracle crop capable of producing biofuel from marginal and degraded lands. Growing jatropha represented a response to both the alarmingly high price of oil and the emerging demand for biofuels that would not harm food security. Jatropha became an icon for a hopeful technocratic narrative seeking to simultaneously address global concerns about climate change, fossil fuel depletion and rural poverty. In 2008, a worldwide survey found 242 jatropha plantations on approximately 900,000 hectares and projected Indonesia as the largest producer in 2015 with 5.2 million hectares. However, many researchers who analyzed such agronomic claims about the crop or the social and environmental impacts in production areas argued that the story was too good to be true. After 2011, 'an extraordinary collapse' was reported from China, India, East Africa and Mozambique. When the results from actual cultivation of the crop failed to fulfill these optimistic expectations, it was assumed that improvement in policies and regulations governing biofuel production would be the best means to improve performance.

Our analysis of the rise and fall of jatropha in Indonesia warns against adopting overly optimistic narratives concerning new technologies as bases for policy making, public budget allocations and investment. An investigation of jatropha's introduction and commoditization as a biofuel crop in Indonesia reveals that despite the enactment of national jatropha biofuel production policies, and intense promotion through awareness creation and the extension of subsidies, jatropha cultivation was only concentrated in short-term 'projects' designed to correspond with government and donor agencies' funding periods. Fieldwork also indicates that researchers, government officials, NGOs and broker companies, rather than farmers or plantation companies, have been the main actors in such projects.

Previous research on agrarian change, state-society relations and local politics in Indonesia, portrays societal change and policy implementation as a product of inter-actions between influential actors who gain mutual benefits within their networks. Such an approach challenges the assumption that policies are implemented in accordance with their normative content and instead acknowledges that the interests of a network of powerful policy entrepreneurs influence the policy process. Our research also describes how the multi-level governance processes that link global energy and climate change discourses to grounded activities in production areas are diverted from their objectives by such policy entrepreneurs at the intermediate levels at which global and local actors interact.

Jatropha in Indonesia

Jatropha development for modern biofuel production in Indonesia started in 1994. At this time, researchers at Bandung Institute of Technology in Bandung attempted to turn the wild plant - commonly used at least since 1907 for making torches and medicine - into a commodity for industrial processing and commercial production. In collaboration with process technicians from the Netherlands (Groningen), the researchers extracted jatropha oil and used it in stationary engines. Their initial success stimulated implementation by their alumni network in domestic energy companies, which began exploring the possibility of cultivating jatropha as an alternative energy source. However, the pioneer companies' experiments in the late 1990s found that jatropha production for plant oil or biodiesel was not commercially viable due to prevailing consumer price subsidies on fossil fuels, a lack of good planting material and the absence of processing facilities or an effective biofuel supply chain.

Government actors became involved in 2003, attracted by positive global biofuel discourse and anticipating blending regulation and production subsidies. A key figure was the director of a historically prominent state-owned agricultural enterprise that had dominated the production of commercial crops such as sugar, tobacco and teak wood. Initially using jatropha oil to reduce the cost of sugar production, this director later published books on the crop's potential, which placed his enterprise at the center of the national jatropha project. Eventually, he became influential in the creation of national energy policy that appointed jatropha as a major source of biodiesel and included mandatory biofuel blending targets.

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Green capital's 'hype'

Word of jatropha's potential spread globally by 2004, encouraged by plant science researchers extrapolating from various trial test results to predict yields. In turn, process technology researchers used these extrapolations to create a narrative that made jatropha appear to be an attractive and environmentally friendly bioenergy crop for agro-ecological zones where oil palm production would not be possible or profitable. The jatropha 'hype' was financialized when the refinery manufacturer D1 Oils raised £11.5 million from their initial public offering on the London Stock Exchange in October 2004, reaching a market capitalization of £72 million in September 2005. The company claimed to have access to millions of hectares of land for potential jatropha cultivation in Africa and Asia. However, the remote locations of these marginal lands made the company's claims difficult to verify.

The extremely positive response of the market to these optimistic scenarios earned jatropha the nickname of 'green gold'. In Indonesia, encouraged by government officials, the promotion of jatropha reached farmers across the vast archipelago. Subsequently, some farmers immediately began cultivating it, using seeds of wild jatropha from their gardens or those distributed during the Ministry of Agriculture's 2005-2006 national jatropha program. Nevertheless, while the national government provided budget support for its cultivation, research and credit subsidies, there was no 'project' for creating a well-functioning marketing channel. When farmers could not sell the harvested jatropha fruit, cultivation eventually halted. Despite this disappointing experience, optimism about jatropha remained so strong that many farmers kept the crop 'hibernating' in their fields in the hope that someday the demand for jatropha would rise.

Hope, opportunity and rent-seeking

D1 Oils' dramatic collapse in the stock market after mid 2007 did not reduce the interest in investing in jatropha projects in Indonesia. However, the definition of 'projects' here is crucial: it is a translation of the Indonesian concept of proyek, a delineated set of activities during a fixed and limited period of time for which there is a budget, usually provided by the government. *Proyek* is commonly associated with opportunities to benefit from mark-ups or with plain corruption. In the case of jatropha, the last opportunity for using large state subsidies was in 2007, when an Indonesian national agribusiness conglomerate owned by the Coordinating Minister of Economic Affairs established a company to manage the largest-ever domestic jatropha investment in Indonesia (around US $ 11 million). This company established jatropha nurseries in 15 districts in South Sulawesi and recruited 8000 'out-growers' on 17,040 hectares. Nevertheless, although run with large capital input by a major company, the project never went beyond the nursery stage. A patronage network of politicians, government officials and businessmen had recruited farmers by collecting copies of their land titles or identity cards to make the company's access to land and labor appear secure. In return for acting as gatekeepers to land and labor, specific 'local elites' obtained jobs or money. Most of the investment was spent on company personnel costs, buying properties and a package credit program for farmers, which failed because farmers were reluctant to repay. The company was officially closed down in 2011 after being idle since 2009. The network effectively absorbed the subsidized investment money without leaving a trace in the fields.

However, this closure was not the end of the story. In 2009, claims that the press-cake residue of jatropha oil extraction could be made into high-value cattle feed revived the optimistic narrative. Jatropha would thus be food and fuel, while the remaining waste could be used as organic fertilizer. Broker companies began to use the updated narrative, depicting business schemes in which they would act as a 'managing company' linking green investment to land and labor. A new pattern emerged, involving local project developers offering (foreign) investors their services to provide access to production areas in return for a lavish salary for a year or two. The risks of speculative investment were passed on to green funds and retail investors, who tend to concentrate on future markets and not on actual production. Typically, within a year or two, the jatropha project would be declared a failure – blaming local conditions and population – and the project developer would disappear, leaving shareholders with worthless shares and increasing farmers' and local governments' cynicism regarding agribusiness investors. In less than a decade, jatropha was transformed from a promising and commercially viable biofuel crop into a green-policy parasite, living on subsidies and green investments.

Policy arenas for future innovations

Policy-making for innovative biofuels in a country like Indonesia must improve in at least four arenas. First, research for new technologies would benefit from an ex-ante critical review of societal arguments, in order to curtail excessive optimism. Second, elite national policy makers should begin with 'due diligence' to deter subsidy harvesters. Third, international actors should simplify biofuels sustain-ability criteria to increase compliance. Fourth, the capacity of local government apparatus in 'marginal land' needs to be strengthened. The final point is to warn against the destructive effect of international 'high risk – high profit' (or loss) capital on local agricultural development. National regulations should prohibit such speculative investments.

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