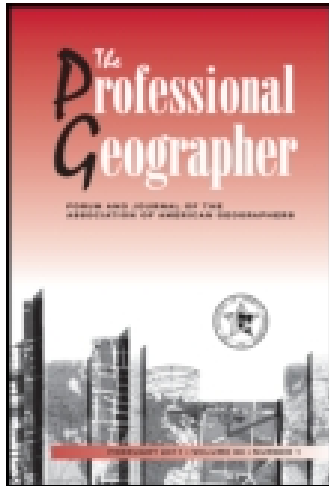


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The Professional Geographer

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rtpg20>

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Published online: 24 Aug 2013.

To cite this article: Shaunna Barnhart (2014) From Household Decisions to Global Networks: Biogas and the Allure of Carbon Trading in Nepal, *The Professional Geographer*, 66:3, 345-353, DOI: [10.1080/00330124.2013.821720](https://doi.org/10.1080/00330124.2013.821720)

To link to this article: <http://dx.doi.org/10.1080/00330124.2013.821720>

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FOCUS: CLIMATE CHANGE IN SOUTH ASIA

From Household Decisions to Global Networks: Biogas and the Allure of Carbon Trading in Nepal*

Shaunna Barnhart

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Nepal has more than 250,000 household biogas digesters that replace firewood with methane for most cooking needs, thus conserving forest resources while reducing indoor air pollution, reducing workloads for energy procurement, and providing a fertilizer slurry by-product. Biogas is also an approved clean development mechanism that reduces carbon emissions, creating a potential revenue stream for the government from global carbon trading markets through aggregating household biogas plants into larger projects for carbon trading. This article traces the shift to biogas as a neoliberal development strategy in Nepal by exploring the connection between biogas as a household energy decision and global carbon trading. **Key Words: biogas, carbon trading, clean development mechanism, neoliberalism, Nepal.**

尼泊爾擁有超過二十五萬座家庭生質沼氣厭氧發酵槽，用甲烷取代柴火來滿足大部份的烹飪需求，因而保存了森林資源，同時降低室內的空氣污染、減少能源取得的工作量，並提供了料漿副產品做為肥料。生質沼氣同時被認證為可降低碳排放的乾淨發展機制，並可透過將家戶的生質沼氣製造廠匯整至更大型的計畫中以進行碳交易，在全球碳交易的市場中，為政府創造一筆潛在的稅收來源。本文透過探討生質沼氣做為家戶能源決定與全球碳交易之間的連結，追溯尼泊爾轉向生質沼氣做為新自由主義發展的策略。 **关键词: 生質沼氣, 碳交易, 乾發展機制, 新自由主義, 尼泊爾。**

En Nepal hay más de 250.000 hogares que utilizan digestores de biogás para reemplazar la leña con metano en la mayoría de las necesidades de cocina, ayudando así a conservar los recursos forestales, al tiempo que reducen la contaminación interna del aire, reducen la carga de trabajo relacionada con la provisión de energía y generan en la lechada un subproducto fertilizante. El biogás es también un mecanismo de desarrollo limpio aprobado que disminuye las emisiones de carbono, creando una corriente de ingresos potenciales para el gobierno a través de los mercados globales compensatorios de carbono, al integrar las plantas domésticas de biogás con proyectos del comercio de carbono de mayor envergadura. En este artículo se evalúa el cambio a biogás como estrategia neoliberal de desarrollo en Nepal, explorando la conexión entre el biogás como un tipo de decisión doméstica relacionada con la energía y el comercio global de carbono. **Palabras clave: biogás, comercio de carbono, mecanismo de desarrollo limpio, neoliberalismo, Nepal.**

Reducing global emissions of carbon dioxide (CO₂) is heralded as an attainable panacea for climate change mitigation that is dependent on a mix of government regulation, corporate commitment, non-governmental organization (NGO) programs, market measures, and individual (or consumer) action. Solutions range from cleaning up industrial processes to hybrid cars to burning less firewood. Wood, which releases CO₂ when burned, is a common energy source on which those living in developing countries are disproportionately dependent. The United Nations Development Programme (UNDP) estimates that in all developing countries combined, 42 percent of the population relies on wood for cooking (UNDP 2009). This varies among countries and among socioeconomic class within countries, but with billions of people who use wood for energy, various initiatives and programs

are underway globally to modernize energy sectors, install efficient-burning cook stoves, and switch to alternative energies for cooking to reduce global CO₂ emissions and improve both local and global environmental quality.

Nepal is one country where global narratives of climate change, carbon dioxide, and reducing firewood dependence converge. Wood is a primary energy source for cooking, on which an estimated 83 percent of rural inhabitants are dependent. Collecting firewood can take up to three hours daily, a task done predominantly by women. Cooking over firewood creates indoor air pollution, causing respiratory illnesses suffered disproportionately by women and children (Bajgain and Shakya 2005). Since the 1970s, firewood has been a focal point in Nepal, first stemming from (often inflated) concerns over deforestation

*The author would like to thank Mr. Devendra Neupane for his valuable contributions as a field assistant and translator. This work is based on research funded in part by a National Science Foundation Doctoral Dissertation Research Improvement Grant BCS-0902865, Fulbright Hays Doctoral Dissertation Research Award, Society of Woman Geographers National and Pruitt Fellowship, and a Juran Doctoral Award and Fellowship.

in the hills, then as an obstacle to wildlife and biodiversity conservation, and now as a global contributor to climate change through CO₂ emissions. One solution to the latest vilified account of firewood for energy is to displace firewood demand by installing household biogas digesters to capture methane for cooking.

Household biogas digesters are a common sight across the Nepali countryside, with more than 250,000 constructed. Cow manure is mixed with water and released into an underground dome tank where anaerobic digestion occurs, releasing methane. A toilet can also be connected to the system. A ball valve above ground controls the flow of methane to the kitchen for use as a cooking fuel. The pressure of the methane in the underground tank pushes the slurry by-product into a holding tank, where it can be composted and used as a natural fertilizer, impacting farmers' bottom lines. Cooking with biogas reduces indoor air pollution, reduces respiratory illness, conserves forest resources, reduces greenhouse gas emissions, and reduces women's drudgery work, all by reducing dependence on firewood as an energy source (Mahat 2004; Bajgain and Shakya 2005; Nepal Biogas Promotion Group 2007; Karki, Shrestha, Bajgain, and Sharma 2009).

Biogas is more than an inventive engineering technique to improve social and environmental conditions by reducing firewood dependence; it is an approved clean development mechanism (CDM) under the Kyoto Protocol. Biogas usage reduces emissions in two ways. First, the methane that would have been emitted regardless through natural processes of decomposition is now harnessed for energy. When methane is burned it produces CO₂ as a by-product, but this is less potent than the original methane. Second, the emissions from the energy source replaced by biogas are eliminated or at least reduced. Biogas usage thus allows for the creation of a new commodity (carbon credits) that the Nepalese government can trade internationally (Bajgain and Shakya 2005; Karki et al. 2009).

Biogas represents a turn toward neoliberal development in Nepal or development through the market. This stands in contrast to biogas's first introduction as a government program in the late 1970s as a way to reduce dependence on foreign imports of fertilizer and fuel. Today, biogas is firmly established as a tool of neoliberal development that seeks to improve quality of life through market choices while providing state entities with a new globally traded commodity—carbon credits. Through an analysis of the historical development of a biogas sector, the pursuit of carbon credits, and transference of carbon rights, this article explores how a family's energy decision is embedded within national efforts to capitalize on carbon trading through biogas as neoliberal development. Before delving into the specific case details, let us first consider the creation of carbon commodities as examples of neoliberal governance.

Creating Carbon Commodities

In 1992, the United Nations (UN) formed the United Nations Framework Convention on Climate Change (UNFCCC) to recognize that human activity is driving climate change and that the impacts of climate change are a common global concern. The Kyoto Protocol, signed in 1997 and entered into force in 2005, commits signatories to reducing greenhouse gas emissions through both national measures and market-based mechanisms. The market-based mechanisms of emissions trading, CDM, and joint implementation are intended to help industrial countries meet the Kyoto Protocol's emission reduction expectations (by buying credits from other countries) and for developing countries to pursue sustainable development projects that reduce emissions, thereby providing them with a marketable commodity (their offset emissions). These mechanisms are intended to provide developed countries with flexibility and cost-efficient avenues to meeting greenhouse gas emission reductions. Developing countries are not subject to an emissions cap but, rather, voluntarily participate in CO₂ mitigation efforts (often in the energy or forestry sectors) in exchange for payments from developed countries (Boyd 2009).

CDM projects must reduce emissions more than what would have been emitted in their absence. The project needs to result in a net reduction of emissions compared to the pre-project technology and it must be measurable and verifiable by an independent party. Through an application and certification process, countries earn certified emission reduction (CER) credits for each ton of CO₂ saved, which can then be sold (UNFCCC 2008a; MacKenzie 2009). The CDM and emissions trading frameworks serve to link the environment and economy by placing a monetary value on ecosystem services and commodifying carbon through CER credits (Boyd 2009). The CDM Executive Board manages the CDM registration process and the granting of CER credits to countries for specific emission reduction projects.

The Kyoto Protocol represents a neoliberal governance strategy that seeks to effectively privatize the atmosphere through pollution allowances. Social and spatial inequalities are common side effects of neoliberal projects, environmental or otherwise. Numerous scholars have critically examined the processes and implications of neoliberal environmental governance, often by focusing on specific case studies (for examples, see McCarthy 2004; McCarthy and Prudham 2004; Robertson 2004; Castree 2008a, 2008b; Corson 2010). *Neoliberalism* refers to "a theory of political economic practices that proposes that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade" (Harvey 2005, 2). Carbon trading as created by the Kyoto Protocol is a neoliberal enterprise that privatizes pollution rights for free trade

in global markets, overseen by the bureaucratic structure of the UNFCCC and CDM Executive Board. The fabrication and sale of carbon emissions as a commodity has sparked an accompanying literature critical of carbon's neoliberal environmental governance (Bachram 2004; Bailey 2007; Bumpus and Liverman 2008; Lohmann 2010).

Market solutions to climate change, specifically carbon trading, reinforce unequal North–South relations and allocate polluting rights to countries based on 1990 emission levels, thus privileging already developed countries (Liverman 2009). Countries with political and economic clout crafted the flexible mechanisms for their own interests “and in doing so set the stage for very modest carbon reductions that did little to reduce the risks of climate change” (Liverman 2009, 295). Arguments that developing countries can reduce fossil fuel emissions more cheaply than developed countries serve to privilege advanced development status while “thrusting the abatement burden as much as possible onto others” (Rosenbaum 2002, 368; MacKenzie 2009). Calculations that indicate “deforestation and livestock in developing nations contributed to global climate warming” stigmatize the difficult economic realities of developing countries (Rosenbaum 2002, 368). Essentially, carbon trading is “a new form of colonialism whereby the north is able to maintain its consumption by paying southern communities a pittance” for carbon-reducing projects (Liverman 2009, 294). The Global North keeps emitting, with minimal lifestyle change, and the burden of behavior changes to save the planet is displaced to the Global South.

To make the carbon commodity viable, new institutions are needed; “the creation, sale and surveillance of carbon credits require a complex set of new institutions and techniques to ensure the stability of the millions invested in the new carbon economy” (Liverman 2009, 295; see also MacKenzie 2009; Independent Evaluation Group [IEG] World Bank 2010). The discourses and governance mechanisms at international and national scales often do not reflect, adequately account for, or acknowledge the complexities and existing local institutions and knowledges in communities where programs (particularly forest-based ones) are implemented (Boyd 2009). Furthermore, the verification and surveillance of carbon credits (is the program *really* reducing CO₂ by the claimed amount?) is an expensive and time-consuming process—potentially years and hundreds of thousands of dollars spent before the first ton of carbon is traded.

The Kyoto Protocol's emissions trading mechanism spawned a parallel voluntary carbon offset (VCO) market. VCOs are driven by companies and individuals who want to do more than government policy allows or who want to enter emissions trading even when governments do not (e.g., the United States; Bumpus and Liverman 2008). The VCO market is designed such that individuals, companies, or public entities can purchase credits that are created by various ventures that somehow contribute to a reduction of greenhouse gas emissions (Lovell, Bulkeley, and Liv-

erman 2009). The stories accompanying specific offset projects give the carbon offset commodity its value. Such programs can deepen global inequalities rather than ameliorate them, but with the rural poor not receiving the economic benefits such projects intend to provide (Corbera and Brown 2010).

What was intended to be common but differentially shared responsibility for reducing emissions has instead become another form of domination by the economically and politically powerful. Despite criticisms of the Kyoto Protocol and its flexible mechanisms, CDM projects and carbon emission reduction schemes are in full swing. Trees are being planted, renewable energy is being built, and landfills are getting capped. Whether such initiatives are enough to produce the needed reduction in emissions is debatable. Regardless, the CDM and emissions trading schemes march on, with mixed results and continued controversy.

Biogas as Response to Oil Crisis

Biogas in Nepal did not begin as a neoliberal project but, rather, as a response to the 1970s oil crisis. Nepal's economy was based on agricultural exports and had become dependent on modernized agricultural methods, which necessitated expensive fossil fuel-derived inputs, particularly artificial fertilizer. The price increases prompted a coordinated government policy on biogas, focusing on manure conservation for fertilizer and the possibility of an alternative fuel for household cooking, lighting, and communal agricultural equipment. The objective was to reach self-sufficiency in fertilizer and fuel needs while reducing both deforestation and burning cattle dung (Agricultural Finance Corporation [AFC] Limited 1980). The Fifth National Plan (1975–1980) identified the problems of depending on imported development materials. Instead, the government sought to foster development through more national self-reliance by developing local human and material resources, thus reducing reliance on volatile world markets and imports. The Plan suggests increasing self-reliance through local technologies such as biogas, solar energy, windmills, and micro hydropower (National Planning Commission [NPC] 1975).

The first year (1975–1976) of the Fifth National Plan was designated as an “Agricultural Development Year,” with biogas promotion and loan programs included as a method to stimulate the rural economy (AFC Limited 1980). In 1977, the government-owned Gobar Gas Tatha Agricultural Equipment Development Company (GGC) was established and remained the sole biogas company in operation until the 1990s. Plants were built primarily among wealthy land owners in the Tarai region, a trend that continued until the early 1990s, in part because such individuals had the financial resources and ability to assume the risk involved in adopting a new technology (van Nes and Lam 1997).



Figure 1 A biogas-powered grain mill with a dual fuel motor. The photograph dates to the early 1980s. Photograph from the Gobar Gas Tatha Agricultural Equipment Development Company archives, courtesy of Mr. Surya Hada.

To bring the benefits of biogas to a wider constituency, the GGC worked in conjunction with various international donor organizations to build communal biogas plants in rural areas with high poverty where individual household plants were unaffordable or impractical (Silwal 1999). The GGC experimented with various forms of community biogas plants with the biogas used for a variety of end purposes including powering agricultural equipment, dual-fuel engines, irrigation pumps, and grain mills (see Figure 1). In addition to being used for locally generated farm machinery fuel, community biogas was also used for rural electrification. Such community projects typically operated for only a few years before falling into disrepair.

Biogas as Neoliberal Development

By the early 1990s, the promotional discourse surrounding biogas had shifted from fossil fuel products independence to forest conservation through displacing firewood for cooking. This accompanied the shift to biogas as neoliberal development and the creation of Biogas Sector Partnership–Nepal (BSP, formerly Biogas Support Programme, funded by The Netherlands) in 1992 to create, monitor, and refine the biogas sector. The BSP has developed a private–public partnership to foster a new biogas sector based on a free market approach, essentially neoliberal development. In so doing, the BSP seeks to address poverty, social inclusion, improved livelihoods, and regional inequal-

ities while enhancing environmental protection (BSP 2009).

The work of BSP accelerated the adoption and construction of quality biogas plants, providing a marked improvement in quality of life for hundreds of thousands of rural households. The BSP sought to promote biogas as an attractive energy option to smaller farmers and farmers in the hills—populations that had not been systemically targeted in the 1970s and 1980s. Tapping into the 1.5 million estimated eligible households for biogas construction also required the BSP to spearhead a substantial restructuring of the biogas sector from a single government-sponsored company (GGC) to the creation of a private market sector with more than eighty biogas companies, sixteen metalworking shops to make the needed components and stoves and the training and employment of thousands of individuals in the biogas sector from salespersons to masons.

The cost of biogas places it beyond the reach of most small farmers. To make biogas more attractive, the government has provided a subsidy to offset the cost of biogas construction consistently since 1991. The subsidy amounts have varied over time, but the consistent availability of a subsidy has aided in the success of biogas adoption (van Nes and Lam 1997; Silwal 1999; BSP 2004, 2009). Even with a subsidy, many small farmers are unable to front the remaining costs and are in need of loans. As a result, microfinance institutions were included in biogas promotion programs. With the increasing availability of credit, more households have chosen to build biogas (Bajgain and Shakya 2005; Winrock International 2005).

गोबरग्याँस



Figure 2 Biogas: Before and after. Source: Nepal Biogas Promotion Group and Biogas Sector Partnership–Nepal. (Color figure available online.)

Biogas has become a technology to achieve the multiple aims of economic development, quality of life improvement, and environmental conservation through consumer market choices and the development of a private biogas sector. Biogas is promoted through posters, brochures, songs, and even a television sitcom. In a country where less than 50 percent of the population is literate, such visual and audio promotion tactics are needed. The promotion of biogas targets the individual household benefits, as seen in Figures 2 and 3. Figure 2 portrays the potential for improved quality of life by switching from firewood to biogas as a primary cooking fuel source. Through the doorway, there is a reference to improved environmental quality, but the primary focus is on tangible benefits to the household. Figure 3 depicts an idealized biogas plant setup in the foreground with a connected outhouse, a collection tank for cattle urine (when combined with cow manure it generates more gas) and a well-maintained compost pit for the slurry. The focus is on direct household benefits of the fertilizer and the clean cooking fuel with a nod to environmental benefits, as seen in the tree and forest in the background.

BSP was launched the same year the Eighth National Plan (1992–1997) was released. The Eighth National Plan was the first plan released after the successful conclusion of the 1990 popular uprising that ended the authoritarian Panchayat regime in favor of democracy. This plan clearly rejects the Panchayat's

centralized controlled economy in favor of creating “an open, liberal, transparent and competitive market oriented economy” by expanding the “participation of [the] private sector in economic activities [through] new monetary, fiscal, industrial and commercial sectors” (NPC 1992). The plan seeks to achieve sustainable economic growth through “the involvement of private sector and increased people’s participation at the community level” (NPC 1992). Such statements indicate that the new government embraced neoliberal development through liberation of the markets and individual choice. Accordingly, biogas entered an era of being promoted as a method of development through free-market choice, as evident in the BSP and SNV/N report on the first five years of the BSP initiative, *Final Report on the Biogas Support Programme Phase I and II: Development Through the Market*.

Biogas as Carbon Revenue

Each biogas plant has revenue potential in global carbon markets, but such trading can only be done through approved entities, such as the government or an NGO. The transaction cost (application, verification, monitoring, etc.) is too high for individuals to trade their own (miniscule) emission reductions in a global marketplace. Biogas plants must be aggregated into clusters and the clusters’ carbon credits are then traded. Farmers commonly take a loan to build

बायोग्याँस प्लान्टबाट निस्केको लेदोको सही प्रयोगगरी उत्पादन बढाऔँ ।

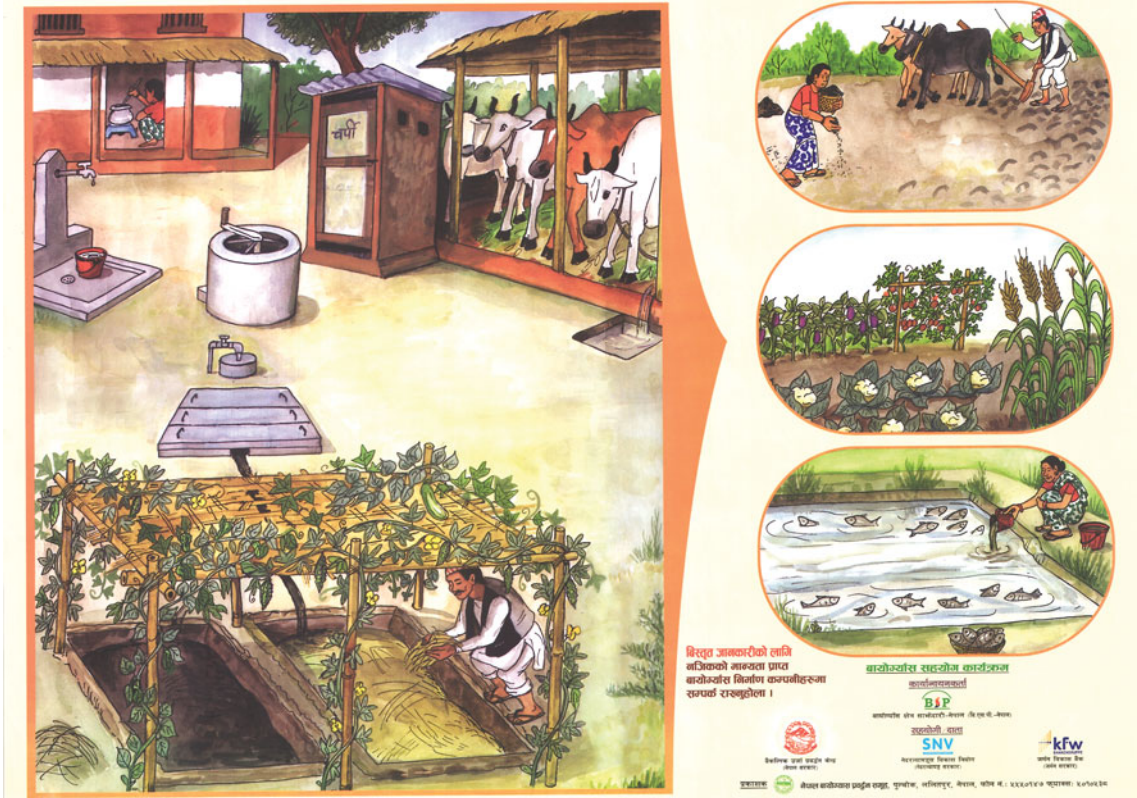


Figure 3 Correct use of slurry from biogas plant increases production. Source: Biogas Sector Partnership–Nepal, Alternative Energy Promotion Center–Nepal Government, SNV Netherlands Development Agency, and kfw German Development Bank. (Color figure available online.)

biogas. Once that plant is operational, and potentially while the farmer is still repaying the construction loan, an approved entity could begin trading in the yearly carbon reductions realized by the biogas usage. The bulk of biogas’s history in Nepal has not been linked to greenhouse gas emission reduction discourses, however. As a former chairman of the GGC explained,

We were not very much familiar with the saving of this emission of the carbon dioxide and all, we have not calculated that way. Just we used to construct biogas. What we found is that we had been saving a lot of trees. We had been saving the health problem of the ladies of the village. We cannot quantify how much health has been protected. (Interview 22 March 2010)

Greenhouse gas emission reduction was not an impetus for the initial biogas promotion but, rather, has become part of the evolving discourses surrounding biogas benefits. Although the basics of biogas benefits to households have not changed, carbon trading creates financial incentive on the part of the government to encourage adoption of biogas technology among rural households.

Nepal’s biogas is an approved CDM under the UNFCCC guidelines. Since 2005, the Nepalese government has been working to get CER credits through

the UNFCCC. Only a fraction of the constructed biogas plants are currently registered as eligible for CER credits. Biogas plants are aggregated into clusters of approximately 20,000 plants and each cluster is then submitted as a project for CER credits. For example, 19,396 biogas plants built between 1 November 2003 and 6 April 2005 were the first to be registered as a CDM project. However, although CDM status was granted, that first application to have biogas approved for CER credits was rejected due to unsatisfactory independent assessment (UNFCCC 2008b).

Before the application for CER credit was rejected, the World Bank’s Community Development Carbon Fund had already agreed to purchase 1 million tons of greenhouse gas emission reductions from the biogas program through Nepal’s Alternative Energy Promotion Centre and made payments to Nepal for fiscal years 2004–2005 and 2005–2006 (Gordan and Jelinek 2006). The World Bank’s Community Development Carbon Fund was established in 2003 as one of multiple “carbon funds” created through the World Bank “as a pilot device for testing practical approaches to the novel challenges of defining, creating, and trading the carbon commodity, and integrating it with development goals” (IEG World Bank 2010, 73). The

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World Bank later concluded that projects for biogas, along with methane recovery, cement, and transportation, “performed below expectations” (IEG World Bank 2010, 77). The Nepalese government has continued working to get the approved CER credits for biogas, a time-consuming and costly process dependent largely on a limited number of Global North-based consultancy firms to assess, monitor, and verify the program and application process.

Carbon Rights

Trading in carbon credits accumulated from household biogas plants relies on the aggregate decisions of individual households to switch to renewable biogas technology and to transfer their carbon trading rights to the government. Each household that builds biogas receives a subsidy funded by the Nepalese, Dutch, and German governments; by accepting this subsidy, households transfer future carbon revenue to the government. The family does not receive the subsidy money directly; rather, the biogas construction company receives the subsidy after construction is complete.

The goal is to make the biogas program financially independent through carbon trading whereby subsidies to future farmers and the cost of maintaining the biogas management program will be paid out of the carbon revenues and not donor financial support. This is dependent on the explicit transfer of carbon rights from the household to the government and World Wildlife Fund–Nepal (for a separate smaller biogas VCO program in select villages in biodiversity conservation target areas). The following statement is found on each biogas contract (translated from the original Nepali). By signing the contract to build biogas, the farmer also agrees to the following:

In addition to this, I the User agree that since I have obtained the grant available for this plant in accordance with the regulation of Nepal, through this agreement, I fully transfer all the benefits including legal rights, incomes, loans, interests that can be obtained due to the greenhouse gas emission reduction from this plant to Alternative Energy Promotion Centre, or World Wildlife Fund, or any other organization that has been appointed. In addition to transferring rights that can be obtained from greenhouse gas emission reduction, I also agree to transfer the making of the necessary documents and implementation activities to Alternative Energy Promotion Centre, or World Wildlife Fund, or any other organization that has been appointed. It was known that income that comes from these rights will be spent by Alternative Energy Promotion Centre, or World Wildlife Fund, or any other organization that has been appointed for grant or technical help for other farmers who want to build biogas.

The statement is written in dense language. When I asked farmers to read it and tell me what it meant, many were not sure of its intent. As one biogas company chairman shared when asked about the carbon rights clause,

It is really hard to make the farmers understand this. Educated people can understand it. Carbon credit can bring income to Nepal. World Bank or some other agency has purchased carbon. . . . This is good. [When selling plants] it is not necessary to speak about this in detail. They also don't understand it. Our contribution helps our nation make income. We tell them that this is the only source of income we have. Sustainable development, sustainable income (Interview 12 March 2010)

There is an assumption that farmers will not understand, and so little effort is put into explaining in detail carbon rights and carbon trade as they relate to the farmers' energy choices. I accompanied one biogas company representative to a village to sign farmers up for biogas construction. He explained the first half of the contract, which is about the obligations of both parties regarding biogas plant construction, but did not explain the carbon rights section. Then farmers simply signed on the dotted line.

Discussion

Although biogas was initially promoted as a reaction to the 1970s oil crisis and a national effort to be more self-sufficient, in the 1990s it became a tool of neoliberal development to improve human well-being through free markets and property rights. This shift to neoliberal development was enshrined in government policy with the Eighth National Plan as a way to undo three decades of failed centralized government policies. The basic premise behind biogas has not changed—organic matter decomposes and this process can be used for multiple productive ends—but the discourses surrounding biogas's promotion has.

It is the aggregate decisions of hundreds of thousands of individual households to invest in biogas that makes the government's participation in international carbon trading possible. Yet the household decision to build biogas is based on biogas's household benefits, not the fact that the government or other national organizations will trade the surplus value (greenhouse gas emission reductions) of a farmer's biogas plant. Based on interviews in the field, few biogas users recognize the financial benefits from carbon trading made possible through their household biogas usage. Biogas remains an attractive energy option for rural farmers regardless of the existence of the carbon market. If people choose to build biogas for the family benefits, what does this say about the efficacy of the global carbon markets and neoliberal development as drivers of sustainable change?

Although grants, subsidies, and loans are available, families must own livestock, have sufficient land for construction, and have access to capital to build a biogas system (or repay a loan). As a result, farmers of middle and high socioeconomic status have benefited disproportionately. Financial constraints and lack of collateral among the poor make biogas unattainable for many (although work is being done to address this, including inventive microcredit schemes, a return to communal plant experiments, and smaller

household digesters fueled with sewage or other organic waste). Along with the wealth disparity, Brahmins and Chhetris (the traditional Nepali elite) benefit disproportionately, owning an estimated 67.5 percent of biogas plants (Karki et al. 2009).

The shift from biogas as a reaction to the oil crisis to a neoliberal development tool has served to reinforce individual energy market choices over communal energy projects. This in turn has reinforced social and spatial inequalities at multiple scales. At the local level, the pattern of biogas adoption within a village can graft onto existing economic and social distinctions. This spatially uneven development is more evident when comparing biogas and poverty rates at the district level. Districts with lower poverty rates tend to have higher percentages of biogas adoption. Thus, a technology lauded to improve quality of life is still unattainable for the poorest. At a national level, carbon trading reinforces global inequalities between developed countries generating the bulk of greenhouse gas emissions and developing countries that are paid for projects to reduce their relatively paltry level of emissions. The global institutional framework developed to create, monitor, and trade carbon emissions is privatizing the atmosphere, a common good on which we all depend.

Government intentions to participate in a potential global carbon market are dependent on the decisions of individual households and community action. This in turn raises the specter of carbon rights: Who owns the carbon and who has the right to reap monetary benefit from its reduction or storage? Nepal is still navigating the carbon market waters and it remains to be seen if the promised revenues of carbon riches will flow as hoped and trickle down to those who power this global carbon commodity system through their individual daily decisions of how to fuel their lives. ■

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