

# Climate Change, “Technology” and Gender: “Adapting Women” to Climate Change with Cooking Stoves and Water Reservoirs

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## Abstract

In the countries most affected by climate change, such as Nicaragua, adaptation technologies are promoted with the twofold aim of securing the livelihoods of rural women and men while reducing the climate-related risks they face. Although researchers and practitioners are usually aware that not every “technology” may be beneficial, they do not sufficiently take into account the injustices that these adaptation technologies could (re)produce. Inspired by the works of feminist scholars engaged in the field of Science and Technology Studies (STS), this article attempts to demonstrate the need to broaden the debate on gender-sensitive climate change adaptation technologies. I argue that, first and foremost, this debate must question the potentially oppressive effects of the climate change narratives that call for technological solutions. Second, I urge feminist researchers and practitioners to denounce the counter-productive effects of adaptation technologies that impede the transformation of the “traditional” gender roles. Based

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on my ethnographic fieldwork in rural Nicaragua, this article calls for rethinking the role of climate change adaptation technologies in offering possibilities for challenging gender inequalities.

### **Keywords**

Climate change adaptation, gender roles, climate change adaptation “technology”, intersectionality, feminist perspective, cooking stoves, water reservoirs, Nicaragua

### **Introduction**

Climate change adaptation “technologies”<sup>1</sup> are an important subject for climate change practitioners. This importance shows in the increasing number of publications dealing with this topic. For example, “Technologies for Climate Change Adaptation”, a guidebook published by the United Nations Environment Program (UNEP), is intended to assist developing country governments and agriculture practitioners in defining their “technology-related” needs. The report describes “technology” in the following terms: “[t]echnology [...] includes physical infrastructure, machinery and equipment (hardware), knowledge and skills (software) and the capacity to organize and use all of these (orgware); but also the biological technology with which farmers produce” (Clements, Haggar, Quezada, & Torres, 2011, p. 14). It further highlights the importance of providing farmers access to “appropriate technologies” that can help them adapt to climate change, and which they can manage sustainably over the long term. These include labor-saving devices such as draught ploughs, improved seeds and cultivation techniques, mobile phones that provide access to market information, etc. (Clements et al., 2011).

In general, international development actors working on climate change have been increasing the efforts to consider the complex impacts that new adaptation “technologies” may have on gender relations. For example, Module 18 on Gender and Climate Smart Agriculture in the “Gender and Agriculture Sourcebook”, published by FAO (Food and Agriculture Organization), the World Bank, and IFAD (International Fund for Agricultural Development), stresses that climate-smart agriculture technologies should have the potential to generate benefits related to gender equality (2015, p. 16). While I recognize and welcome these

efforts, I argue that neither researchers nor practitioners sufficiently discuss the possible effects of adaptation “technologies” on gender relations. Indeed, in Nicaragua, so-called gender-sensitive “technologies”, such as wood-saving stoves and water reservoirs, are usually conceived as based on a limited understanding of gender, and they are designed for women, considered as a homogeneous group with similar (“technological”) needs.

Inspired by the work of feminist scholars, engaged in science and “technology” studies (Cockburn, 1997; Haraway, 1988, 1997; Harding, 1986; McNeil, 2007; Wajcman, 2010) as well as by the feminist understanding of intersectionality (Crenshaw, 1991; Elmhirst, 2011; hooks, 2000; Nightingale, 2011; Weasel, 2004), my aim in this article is to show how a feminist perspective can broaden the understanding of gender-sensitive climate change adaptation “technologies”. It means that practitioners should not only consider the potential (gendered) benefits and drawbacks of “technologies”, such as seed storage systems, solar stoves, mobile phones or water reservoirs, but also the (gendered) cultures and practices that may be associated with the promotion of these “technologies” (Wajcman, 2010, p. 143). Indeed, as per the feminist political ecology scholarship, I understand the relationship between gender and the environment as a dynamic process in which culture and society play an integral role (Nightingale, 2006). In this understanding, the transformation or reinforcement of “traditional” gender roles and relations, along with the related subjectivities, can be seen as manifestations of power struggles at the level of both discourses and practices relating to climate change adaptation. Within such an approach, my interest lies in examining the possible oppressive effects of climate change adaptation “technologies” when it comes to (re)producing unequal gender relations in rural Nicaragua. I attempt to provide empirical evidence and theoretical justification for what I consider the urgent need to rethink the role of climate change adaptation “technologies” that are presented as offering possibilities for challenging current gender inequalities.

First, I present my theoretical framework, research methods, and the context of my research while illustrating how climate change practitioners’ choice of adaptation “technologies” is embedded in assumptions about smallholder farmers and their practices. Then, I explain how the climate change “technologies” that purportedly have a gender perspective alienate their mainly female beneficiaries by tying them to “traditional” gender roles of fetching wood and water. I conclude the article by highlighting that the narratives through which women are called to adopt

adaptation “technologies” are only becoming a means to entrench the existing gender roles instead of promoting their transformation to equality. Indeed, in my case study, these narratives are not based on the perspectives nor oriented toward the needs of local community members. In fact, because of a limited understanding of gender roles as immutable, the wood-saving cooking stoves or water reservoirs that were introduced served mainly the interests of men. It happened not only because the work burden of men was alleviated, but also because unequal patriarchal relations were not tackled. I argue that this outcome necessitates more research on the possible roles of adaptation “technologies” in offering possibilities for the transformation of unequal power relations, including those related to gender.

### **The Feminist Perspective to Climate Change Adaptation “Technologies” in Rural Nicaragua**

My approach to climate change adaptation “technologies” builds on three important principles of the feminist perspective on science and technology studies. They are: (a) the mutually constitutive character of technology and gender, (b) the intersectional perspective dear to third wave feminists (Crenshaw, 1991; Elmhirst, 2011; hooks, 2000; Nightingale, 2011; Weasel, 2004), and (c) the need to see the processes through which climate change adaptation “technologies” are introduced as processes mediated by power relations.

First, like other feminist scholars who have engaged in science and technology studies (Cockburn, 1997; Haraway, 1988, 1997; Harding, 1986; McNeil, 2007; Wajcman, 2010), I base my analysis on the recognition that adaptation “technologies” contribute to the construction of gender relations. Conversely, gender relations also construct adaptation “technologies”. As Wajcman states, “the intersection of feminist scholarship and STS [...] [has put the] focus on the mutual shaping of gender and technology, where there is no presumption that either gender or technology are pre-existing or that the relationship between them [is] immutable” (2010, p. 144). This co-construction occurs at the symbolic level in the narratives of the climate change projects that may consider rural women and men who adopt climate change “technologies” as potentially adapted to climate change. Such narratives give them new subject and leadership positions within local societies. Indeed, “socio-technical relations are manifest not only in physical objects and institutions but also in symbols, language and

identities” (McNeil, 2007, cited in Wajcman, 2010, pp. 144–145). Thus, the relationship of rural women and men to adaptation “technologies” can produce or challenge subjectivities related to gender or other factors that may potentially become either oppressive or advantageous (Haraway, 1997, cited in Wajcman, 2010, p. 145).

A second important aspect in my approach is the use of the intersectional perspectives. Indeed, “[p]eople are not just men and women with culturally defined roles, but inhabit multiple and fragmented identities that intersect with class, race, ethnicity, sexuality, etc.” (Elmhirst, 2011, cited in Tschakert, 2012, p. 149). These multiple and fragmented identities all contribute toward shaping the way rural women and men experience climate change as well as their relation with adaptation “technologies”. The differences emerge and are produced out of everyday practices (Nightingale, 2011, p. 155) of using or witnessing the use of these “technologies”. These differences in experience can be both symbolic (when, for example, women’s experiences are influenced by the new identity they are assigned as those most apt to implement energy-saving activities) and material (when the experiences of particular people are colored by the fact that they live a long distance from water sources). It is important to note that my justification for using the intersectional perspective also explains why, while I am interested in gender, I do not look at gender alone. Indeed, gender can never be a category that will by itself explain oppressions or privileges. People are never just women or men. And whether gender intervenes as an oppressor or an advantage, it always works together with other factors, such as ethnicity, class, age, and geographical location. Thus, rather than identifying the categories at play as advantageous or disadvantageous in access to or the ability to take advantage of climate change adaptation “technologies”, I focus on understanding how their intersection can become oppressive.

The empirical data for this case study were collected between 2013 and 2014 through participant observation and interviews with women and men in a rural community of the “Dry Corridor” of Nicaragua, recognized as the area most affected by climate change in the country (Campos Cubas, Madriz Paladino, López Baltodano, Valle Miranda, & Montiel Fernández, 2012). According to the 2014 community census, this community, situated in the municipality of Telpaneca in the northern department<sup>2</sup> of Madriz, is made up of 42 families. Most inhabitants are small-scale farmers producing maize, beans, and some vegetables on small plots of an extremely degraded land. Some of them own a limited number of livestock. The landscape of the community has changed considerably in the last 50 years; the pine forests that covered the hills have

disappeared as a consequence of enterprise-led commercial deforestation during the 1970s. The green revolution of the late 1980s and early 1990s brought with it the increasing use of herbicides which promoted the clearing and planting of large areas of forest. More recently, the expansion of cattle-ranching by those who do not live in the community has contributed to increased deforestation and land degradation.

Since the beginning of 2014, a Nicaraguan non-governmental organization (NGO) has been implementing a climate change adaptation project in the community with the help of the United Nations Development Programme (UNDP). The project is part of the United Nations' "Territorial Approach to Climate Change" (TACC) program that among its objectives seeks to increase resilience to climate change impacts. The program is currently being implemented in several river basins of the "Dry Corridor" where the climate change narrative has become increasingly present in the lives of small-scale farmers, through the introduction of adaptation projects, training sessions, and the promotion of adaptation "technologies".

I interviewed 40 rural women and men in the community about the changes they experienced in their lives. I also interviewed 20 climate change and development experts working in academia, international and Nicaraguan NGOs, and 10 feminist activists working in NGOs, women's movements, or academia. I analyzed the available project documents and attended numerous activities related to climate change adaptation, including training workshops and seminars. I also held informal discussions with rural women and men, climate change practitioners, gender specialists, and feminist activists in Nicaragua. I participated in the everyday lives of families in the community and listened to many personal life stories to "illuminate cognitive, symbolic, and even linguistic aspects of climate change, as well as behavioral responses and power dynamics at both micro- and macro-scales" (Roncoli, Crane, & Orlove, 2009, pp. 103–104).

One of my important findings was the discursive struggle between what is considered as "technologies" by the climate change adaptation project, and what falls outside this denomination. This aspect relates directly to the third point of my framework that sees the process of introducing adaptation "technologies" as a process of power. In the following section, I discuss several problematic aspects of the climate change project that are related to it: first, by prioritizing technological solutions, it overlooks social transformation as a necessary adaptation strategy; second, it does not consider that "technologies" could contribute to challenging social inequalities.

## Climate Change Adaptation “Practices” and “Technologies”: A Discursive Hierarchy

Before the implementation of its activities, the TACC program commissioned a study of the climate change adaptation “practices” and “technologies” to be supported by the project (Benavidez & Olivas, n.d.). These “practices” and “technologies” were selected on the basis of their considered potential to make the local rural inhabitants more resilient to climate change. Completed in six communities of two departments of the “Dry Corridor” with 124 research participants, who were interviewed individually or in focus groups, the study resulted in what some beneficiaries of the project commonly call the “menu of technologies”.<sup>3</sup>

The study (Benavidez & Olivas, n.d.) made a distinction between climate change adaptation “practices” and “technologies”. “Practice” is described as “the action that is developed with the use of traditional or local knowledge” while “technology” is defined as “the set of technical and scientific knowledge or equipment or techniques that contribute to design and create goods and services for environmental adaptation and to meet the needs of rural families” (Benavidez & Olivas, n.d.). In this study, the reforestation and the nonuse of slash and burn were designated as climate change adaptation “practices”, while the establishment of barriers, dams, cisterns, reservoirs and the use of organic fertilizers were categorized as adaptation “technologies”. While the study did not establish a hierarchy among these “practices” and “technologies”, this distinction has led to “technologies” being considered superior to “practices” in the daily activities of the project. It was evident during a TACC training session on climate change adaptation on February 9, 2014.

One of the exercises during the workshop was to compare two landscape pictures: (a) a degraded (black and white) landscape with visible signs of erosion, monoculture, and lack of water and (b) a protected (full color) area demonstrating soil and water conservation practices. In a discussion of the pictures, Don Mariano,<sup>4</sup> a farmer from the community who has been very active in such projects, qualified the conserved landscape as “technified”<sup>5</sup> as opposed to the degraded landscape. For him, “technification” referred to all the “technologies” that TACC had been promoting in the region. Comments by other participants at the workshop indicated that the rest of the participants agreed with Don Mariano’s interpretation. The most frequently identified “technologies” consisted of the diversification of agricultural production, reforestation, construction of reservoirs for water storage, rainwater harvesting, soil and water conservation techniques, organic production, and stalls for the animals.

It is noteworthy that these “technologies” used to be called differently before climate change adaptation became a national priority (Nicaraguan Government, 2010, 2012). As a former development worker in Nicaragua between 2002 and 2010, I remember they were designated, for example, as peasant and indigenous farming practices or natural resources management practices. Adaptation projects have led to the “re-legitimation and repetition of old development practices” (Ireland, 2012, p. 92) in a way that they discursively become part of a “technified” environment seen as resilient to climate change, thus losing their “indigenous” character.

The change in the discursive status of the old development “practices” also has a fallout on the subjectivities of the people who are supposed to use these “technologies”. I noticed how a project technician told a group of youngsters chosen to promote the project, “You were chosen because you have a higher level of knowledge than... let’s say... the producers” (Project facilitator, Telpaneca, May 29, 2014). The producers, he referred to, were the male adult farmers of the community, usually above 40 years of age with no secondary school education since a school did not exist until a few years ago in the community. The technician’s explanation posed an open challenge to the “traditional” local perspective in which ancestral knowledge held mainly by the elderly is valued.

I argue that the discursive shift from “practices” to “technologies” reflects the dominant approach to climate change that accords primary importance to the scientific knowledge constructed as objective and neutral (MacGregor, 2010). In such a view, technological solutions are considered better, especially if coming from outside the community. This discursive hierarchy not only undervalues ancestral knowledge but also excludes some possible subjects for adaptation. Indeed, the climate change adaptation project in the community is presented by its coordinator and technician as a project implemented with a river-basin approach. In theory, such an approach would entail working with all the people who are likely to have an influence on its ecosystem. However, the project only focuses on the smallholder farmers and no actions are targeted at economically and often politically powerful cattle-ranchers who own large swathes of land and are behind the biggest forest fires or the unsustainable use of local water resources.

The feminist notion of situatedness (Haraway, 1988) in relation to climate change knowledge is crucial to highlight such injustice behind what counts as a valuable knowledge (related to “technologies”) and what is considered less valuable (related to “practices”). Following the argument in Melissa Leach and James Fairhead’s work that builds on



feminist scholarship (Haraway, 1988), it appears crucial to “displace the focus somewhat from the content and epistemology of knowledge, to the historical and institutional relations in which such knowledge develops and is represented” (Leach & Fairhead, 2002, p. 302). The same argument is valid for climate change adaptation “technologies”. In the above case, it seems that the historical and institutional relations in which climate change adaptation “technologies” are promoted are embedded in unequal power relations. The inequalities relate, for example, to class as smallholder farmers are seen as “culprits” of deforestation and required to adapt to the resulting changes when, in fact, wealthy cattle-ranchers are to be blamed. The inequalities also relate to ethnicity and generational divide; the indigenous knowledge of the elderly is considered less valuable than “scientific” knowledge transmitted to youth.

After having shown the problematic discursive divide that is established between “technologies” and “practices”, I now turn to the “technologies” that are promoted as part of the gender component of the project. Who is called upon to adopt so-called gender-sensitive “technologies” and with what justification?

### **“Adapting” Women to Climate Change with Cooking Stoves and Water Reservoirs**

When I first arrived in the community, an NGO worker, who had been active even before 2010, told me about a group of women in the community called *Las Vulnerables*. It took some time to find the group, as in 2014 they had changed their name to Grupo San José, San José being the patron saint of the community. The members recounted that the group was formed in the early 2000s to care for the health of children in the community. Doña Rosa, a 28-year-old married woman, mother of two girls and a founder of the group, explained that a male technician suggested they should adopt the name *Las Vulnerables*. “He told us that it was a good name for the group because some of us were single mothers... and... the others... well, the others... we were women” (Doña Rosa, interview, April 11, 2014). Even though this dialogue took place 10 years before the first climate change project arrived in the region, it reflects the narratives of climate change initiatives, where women are still often constructed as a homogeneous group and as the main victims of climate change.

This construction of women as the most vulnerable to climate change is based on the argument that in rural areas water and wood collection for household needs are the responsibility of women as a part of their reproductive role. This argument states that the time women spend gathering water and wood is increasing since they have to walk further to find these resources as a result of environmental deterioration and deforestation. By this reasoning, women are likely not only to suffer more from the consequences of climate change, but they will also be more eager to implement actions that alleviate their increasingly heavy duties (Soares, 2006a, 2006b). It begs the question: what are the “discursive and cultural constructions of hegemonic masculinities and femininities” (MacGregor, 2010, p. 127) that justify the promotion of wood-saving cooking stoves and water reservoirs by climate change projects under the label of gender-sensitive climate change adaptation “technologies”? It is equally important to understand how the actual beneficiaries of these “technologies” challenge hegemonic gender identities.<sup>6</sup>

With the justification that fetching water and wood is a part of women’s “traditional” gender roles, together with a concern for women’s respiratory health and deforestation, the climate change adaptation project in the community selected 26 women to be the direct beneficiaries of wood-saving stoves. These women were asked to sign a paper showing their acceptance of the stove they were to receive. However, at least, half of the women did not want to sign the document as they could not sign something without the permission of their husbands. This happened during the dry season when many men from the community were working on coffee, sugarcane, or tobacco plantations elsewhere. The project staff interpreted the refusal of the women participants as a manifestation of their lack of empowerment. They expressed their astonishment that these women could not themselves decide on an issue that in their view fell under their responsibility. However, interviews with 12 women and eight men of 16 different households in the community revealed that women and men shared the responsibility of fetching wood. Table 1 shows a classification of responses regarding who fetches wood for household needs, as well as the perceived advantages of the wood-saving stoves by the households that benefited from them.

While these examples may not be quantitatively representative of the 42 households of the community, they demonstrate that the construction of fuel gathering as an exclusively female chore reinforces “traditional” gender roles that are “traditional” only in the view of the project implementers. Indeed, in all the households but two, men were involved in fetching firewood. In 11 of the 16 households, men were predominantly

**Table 1.** Responsibility of Fetching Wood and Use of Improved Cooking Stoves in Households of the Community

Responsible of Fetching Wood in the Household	Number of Households	Number of Households that Received Improved Cooking Stove	Number of Households where Reduction in Use of Wood is Observed with New Stove	Number of Households where Reduction in Smoke is Observed with New Stove
Men only	7	4	3	2
Usually men, occasionally women and children (when men not available)	4	4	4	1
Men and women with children (alternating upon availability and needs)	3	3	3	1
Women only	1	0	0	0
Do not fetch wood: household members buy or exchange it for goods with people external to the household	1	1	1	1
<b>Total</b>	<b>16</b>	<b>12</b>	<b>11</b>	<b>5</b>

**Source:** Author's work, based on individual interviews in the community, January–December 2014.

in charge of this chore.<sup>7</sup> The only household where a woman alone was responsible for gathering wood was that of a single woman who lived on her own. One household that bought or exchanged fuelwood for goods such as eggs or maize consisted of an elderly couple with limited mobility, two adult children with mental disabilities, and a five-year-old granddaughter. Out of the 14 households in which men were involved in fuelwood gathering, 12 received wood-saving stoves. It was seen as a clear benefit in all but one household consisting of a young couple and their

two daughters. Before they were provided with a new cooking stove, they had built one from local materials such as clay and stones and their stove was as energy efficient as the cement stove received from the project. But, in order to receive a project stove, the project staff asked the couple to destroy the former stove, something that both, husband and wife, told me they regretted.

In the 11 cases, in which men were predominantly involved in fuelwood gathering, the stove benefited them. This situation is contrary to the project aim of reducing the time women spent on gathering wood. In this situation, the women would have benefited more had they been given a stove that emitted less smoke. Indeed, participant observation showed that mostly women were in charge of cooking (with some exceptions among the younger generation which are discussed further). However, in seven cases no smoke reduction was observed. It was because of the fact that no chimney was installed for reasons such as the unsuitability of a plastic roof for a chimney. In one case, an increase in smoke was caused by the fact that a household decided to keep both their former stove and the new one, against the advice of the project.

The second argument, underlying the discursive construction of women as victims in the face of climate change, is that with increasing water scarcity, due to climate change, women may suffer more because they would have to walk further to find the resource. The introduction of water reservoirs for rainwater storage during several months of the year is an adaptation “technology” widely discussed in the “Dry Corridor” of Nicaragua where rainfall takes place between June and October. My findings, shown in Table 2, challenge the widespread

**Table 2.** Responsibility of Fetching Water and the Use of Water reservoirs in Households of the Community

Responsible of Fetching Water in the Household	Number of Households	Number of Households that Received Water Reservoirs
Mainly men	4	2
Men and women with children (alternating upon availability and needs)	4	2
Women only, occasionally with children	5	2
Total	13	6

**Source:** Author’s work, based on individual interviews in the community January–December 2014.

image of the woman with a bucket on her head struggling to find water in a dry landscape. They illustrate that women are not the only ones in charge of fetching water, and thus, not the only ones to benefit from the water reservoirs.

In eight of the 13 households interviewed, men were involved in fetching water while it was the responsibility of women in the rest of the five households. Interestingly, these five women, one single and four married, were around or over 50 years of age (with husbands of approximately the same age or older). The four cases, where men and women shared the responsibility of fetching water, were of young couples (in their early 20s and 30s) with young children. The four households in which men were in charge of fetching water consisted of a single man who was raising his grandsons alone, an elderly couple with reduced mobility whose grandsons helped them with water-fetching, and two married couples in their late forties with several young sons on the farm.

Interestingly, the drivers for the transformation of water and firewood fetching duties relate to two apparently contradictory factors. First, they are linked to the maintenance of “traditions” which make women responsible for household related tasks. Recent deforestation and water scarcity oblige rural populations to walk further and further to find these resources. While women stay at home, it is increasingly men who fetch wood and water after a day of farm work. As Doña Rigoberta, a 49-year-old married woman with ten children put it, “the men bring wood from where they are working” (Doña Rigoberta, interview, October 23, 2014). In her family, wood is currently gathered from a 3.5-hectare plot her husband and sons are renting from the largest cattle-rancher of the community to plant staple grains. In addition, compared to ten years ago, there is also an increased use of donkeys and horses to fetch water in the community as water sources are further afield. The fact that animals are, generally, the responsibility of men in this community can also explain why men have become increasingly involved in fetching water.

These examples demonstrate that while gender roles are changing due to decreasing water and firewood availability, the direction in which they are transforming is strongly influenced by hegemonic gender identities that confine women to the house and accept men’s mobility, and the responsibility of handling livestock. The second reason why water and wood fetching have become less of a woman’s chore relates to an observable change in the distribution of roles between young heterosexual couples. In older couples, women are mostly in charge of fetching water, while in young couples both the husband and wife share this responsibility.

Cases of single men or households where young men are numerous also show that gender roles in fetching water are transforming. This transformation was confirmed by Doña Ninoska, a 60-year-old married woman with six children and a 71-year-old husband.

Doña Ninoska: The men of before didn't want [to do "women's work"], for example my husband doesn't like to clean the stove. [...]. He says, 'I'm not gay, he says, 'I'm not a woman''. He doesn't like it. And he prefers to die of hunger than lighting the fire.

Me: If there is nobody, maybe he lights it.

Doña Ninoska: No, even if there is nobody he doesn't light it[...]. Youngsters today [are different]. For example my sons cook. When I am not at home they cook for themselves, [they make] their eggs, their tortillas...<sup>8</sup> (Doña Ninoska, interview, August 12, 2014)

I personally saw one of Doña Ninoska's son, a 38-year-old married man with three children, cooking at home and fetching water. He is also active at the primary school of his eight-year-old where he takes part in cooking the food received through a governmental school program. In my interviews, it was mostly people over the age of 40 who noticed changes in gender relations. Some of the interviewees attributed the conditions that facilitate these changes to governmental policies that promote equal rights for women and men. As Doña Rosibel, a 48-year-old married woman explained,

Back then it was more difficult because you see, if [my husband] Don Lalo, who is the man, was in the house and he said "look, here I put this bag of beans and you won't touch it", that's how it had to be. It is true that it was like this in these times: the man decided everything and the man was in charge. [...] Today [it is different]... and I am very grateful for this to [the wife of the President] Mrs. Rosario Murillo and [the President] Don Daniel Ortega because they put those limits that say that I have as many rights as my husband and then I can tell you that it's good for me, I like it. (Doña Rosibel, interview April 25, 2014)

The changes in gender roles are not only related to the governmental measures mentioned by Doña Rosibel that I discuss in detail elsewhere (Gonda, n.d.). They are also linked to decreasing maize production due to increasingly recurrent droughts, a decrease in land fertility, and lack of technical and economic support for smallholder farmers. Interestingly, some women established the link between the decrease in land productivity and water

availability to positive changes in the duties traditionally assumed by women. For example, Doña Fernanda, a woman in her late 30s from a community in a different (humid) agro-ecological region that is also witnessing the effects of droughts, shared the following with me:

Before women used to make more tortillas [...] Now, just the cassava and the plantain. And before, we used to eat more tortillas. [There was] more corn. It used to be harvested in big quantities, enough. And now, only few harvests are good. The lands have become exhausted. (Doña Fernanda, Interview, June 26, 2013)

Doña Fernanda explained that in her youth, women used to spend one hour, generally, from 3 am to 4 am, to prepare tortillas for breakfast and would continue to prepare fresh tortillas three times a day. Now, due to lower tortilla consumption caused by less maize production and lower availability of firewood, this duty has eased. Indeed, the boiled cassava or plantain that is increasingly served for meals instead of the tortilla requires less firewood and preparation time. It shows how roles attributed to women are changing due to the decrease in maize production that may be related to droughts but also to changing prices, land use pressure, increase in cheap import of staple food, and increase in wheat and bread consumption from small bakeries and large grocery stores. Doña Fernanda explained that in this case, the decrease in maize consumption and firewood availability translated into longer sleeping hours for her, a change that she considered positive.

## Conclusion

The introduction of improved cooking stoves and water reservoirs as gender-sensitive climate change adaptation “technologies” attempts to transform subjects, in particular, women “in a certain improving direction” (Scott, 1995, p. 200 cited in Rankin, 2001, p. 30) consistent with prevailing gender roles that are seen as “traditional” and immutable. This is done through the discursive cultivation of the vulnerable but environmentalist woman who implements climate change adaptation both to challenge her vulnerability and because she is “naturally” called to do so by her gender roles. With this aim, the climate change projects appropriate the vocabulary of empowerment, illustrated by the intentions of the project staff to ensure that women are the direct beneficiaries and users

of stoves by affixing their signature. But the limited understanding of the so-called “traditional” gender roles results in the introduction of wood-saving stoves or water reservoirs mainly serving the interests of men rather than resulting in the double outcome of both climate change adaptation and gender equality. It happens not only because male chores are eased, but also because patriarchal unequal relations are not addressed. Promoting climate change adaptation “technologies” for women that reinforce “traditional” gender roles is, therefore, problematic. These “traditional” gender roles are not as “traditional” as imagined by the climate change practitioners. Furthermore, this understanding makes climate change adaptation, together with fetching of water and fuel-wood, part of the reproductive roles of women. In addition, as my participant observation and interviews show, gender roles are changing, something that climate change interventions tend to overlook. It is unfortunate because these interventions could, in fact, build on these transformed gender relations, especially when they are positive. There is also little mention in the climate change field of the fact that “traditional” roles of women, such as making tortillas, can become less burdensome under the effects of climate change.

Adaptation researchers and practitioners need to better include the feminist perspective in their approaches to gender when they support the introduction of adaptation “technologies” in rural communities. It means recognizing that “technology” and gender are co-constitutive both at the material and symbolic levels, that gender as an oppressive or privileging factor never acts on its own, and that climate change adaptation “technologies” are an artifact of power. The feminist approach can help in focusing on the transformative role of gender instead of focusing on static gender roles. It also means paying increased attention to the effects of (gendered) discourses (Elmhirst, 2011) on “technologies”. Finally, this perspective opens up the space to talk about resistant subjectivities, for example, through cases of women who do not want to be seen as vulnerable, who do not fetch water and wood any longer, or men who assume roles traditionally attributed to women as part of their (gendered) climate change adaptation strategies.

There is a need for more ethnographic research on climate change adaptation that can help to detect the contestation of technologies of power that construct and reinforce hegemonic gender identities. Such research, for example, could focus on analyzing small resistances to climate change adaptation “technologies”. The role of intersecting disadvantage factors in creating (climate) vulnerabilities or influencing



adaptation strategies must be taken into account to explain why some people adopt technology and others do not. Such contestations, in particular, can explain why some projects fail to meet their objectives. Gendered subjectivities and resistances matter. They can help challenge the “technified” adaptation schemes that mostly target smallholder farmers who are constructed as culprits of deforestation or women who are seen as tied to their traditional gender roles. In an era in which institutions like Food and Agriculture Organization (FAO) or the Consultative Group for International Agricultural Research (CGIAR) like to call for *climate-smartness* in agriculture, there is a need to deepen the debate on the *gender-smartness* of the adaptation “technologies” that are promoted. While this debate has already been initiated (Twyman, Bernier, Muriel, Paz, Ortega, & Koningstein, 2015), feminist scholars and practitioners have a responsibility to push it forward.

## Notes

1. Throughout the article I use the word “technology” in single quotation marks because as I will show later, the very definition of what counts as a climate change adaptation “technology” as opposed to what falls outside this denomination is embedded in power relations. When I use other words in single quotes it is also to highlight the power relations that determine the choice of the wording.
2. Administrative division of Nicaragua.
3. All translations of the interviews and the documents into English, originally written in Spanish, are mine.
4. All names have been changed.
5. The word used in Spanish was “tecnificado”.
6. Based on Margaret Wetherell and Nigel Edley’s (1999) definition, I define hegemonic gender identities as the way in which women and men “conform to an ideal and turn themselves into complicit or resistant types, without anyone ever managing to exactly embody that ideal” (Wetherell & Edley, 1999, p. 337; cited in Connell & Messerschmidt, 2005, p. 84).
7. Research by Terry Sunderland et al. (2014) suggests that men are more engaged in fuelwood collection than women in Latin America in comparison to other regions of the world like Africa. What is interesting for my argument is that despite this observation, the climate change discourse gives women the responsibility for firewood fetching everywhere, as if the world would be a homogeneous place. Also, my interviews show an evolution that with growing water scarcity, it is increasingly men who are in charge of fetching water.
8. Tortillas are tarts made of corn that Nicaraguans usually eat with most of their meals.

## References

- Benavidez, Y., & Olivas, A. (n.d.). *Inventario de Tecnologías y prácticas para la adaptación al cambio climático en Las Segovias* [Inventory of technologies and practices for climate change adaptation in Las Segovias]. Retrieved April 12, 2016, from <http://www.farem.unan.edu.ni/redcambioclimatico/docs/PNUD-Inventario%20de%20Tecnologias.pdf>
- Campos Cubas, V. M., Madriz Paladino, M., López Baltodano, M., Valle Miranda, I., & Montiel Fernández, W. (2012). *Mapeo de riesgos, procesos, políticas públicas y actores asociados al cambio climático en Nicaragua* [Mapping of climate change risks, processes, public policies and associated actors in Nicaragua]. Managua, Nicaragua: Centro Humboldt.
- Clements, R., Hagggar, J., Quezada, A., & Torres, J. (2011). *Technologies for climate change adaptation—agriculture sector*. Roskilde, Denmark: UNEP Risø Centre.
- Cockburn, C. (1997). Domestic technologies: Cinderella and the engineers. *Women's Studies International Forum*, 20(3), 361–371.
- Connell, R. W., & Messerschmidt, J. W. (2005). Hegemonic masculinity. Rethinking the concept. *Gender and Society*, 19(6), 829–859.
- Crenshaw, K. (1991). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stanford Law Review*, 43(6), 1241–1299.
- Elmhirst, R. (2011). Introducing new feminist political ecologies. *Geoforum*, 42(2), 129–132.
- FAO, World Bank, & IFAD. (2015). *Gender in climate-smart agriculture: Module 18 for the Gender in Agriculture Sourcebook*. World Bank Group, FAO and IFAD. Retrieved April 12, 2016, from <http://www.fao.org/3/a-az917e.pdf>
- Gonda, N. (n.d.). Revealing the patriarchal sides of climate change adaptation through intersectionality: A case study from Nicaragua. In S. Buckingham & V. Le Masson (Eds), *Understanding Climate Change through Gender Relations* (unpublished). Routledge.
- Haraway, D. (1988). Situated knowledges: The science question in feminism and the privilege of partial perspective. *Feminist Studies*, 14(3, Autumn), 575–599.
- . (1997). *Modest\_Witness@Second\_Millennium.FemaleMan\_Meets\_OncoMouse: Feminism and technoscience*. London, New York: Routledge.
- Harding, S. G. (1986). *The science question in feminism*. Ithaca, London: Cornell University Press.
- hooks, B. (2000). *Feminist theory: From margin to center*. London: Pluto Press.
- Ireland, P. (2012). Climate change adaptation: Business-as-usual aid and development or an emerging discourse for change? *International Journal of Development Issues*, 11(2), 92–110.
- Leach, M., & Fairhead, J. (2002). Manners of contestation: “Citizen science” and “indigenous knowledge” in West Africa and the Caribbean. *International Social Science Journal*, 54(173), 299–311.

- MacGregor, S. (2010). Gender and climate change: From impacts to discourses. *Journal of the Indian Ocean Region*, 6(2), 223–238.
- McNeil, M. (2007). *Feminist cultural studies of technoscience*. London, New York: Routledge.
- Nicaraguan Government. (2010). *Estrategia Nacional Ambiental y del Cambio Climático. Plan de Acción 2010–2015* [National Environmental and Climate Change strategy. 2010–2015 Action Plan]. Managua, Nicaragua: Nicaraguan Government.
- . (2012). *Plan Nacional de Desarrollo Humano 2012–2016* [National Human Development Plan 2012–2016]. Managua, Nicaragua: Nicaraguan Government.
- Nightingale, A. J. (2006). The nature of gender: Work, gender and environment. *Environment and Planning D*, 24(2), 165–185.
- . (2011). Bounding difference: Intersectionality and the material production of gender, caste, class and environment in Nepal. *Geoforum*, 42(2), 153–162.
- Rankin, K. N. (2001). Governing development: Neoliberalism, microcredit, and rational economic woman. *Economy and Society*, 30(1), 18–37.
- Roncoli, C., Crane, T., & Orlove, B. (2009). Fielding climate change in cultural anthropology. In S. A. Crate & M. Nuttall (Eds), *Anthropology and climate change: From encounters to actions* (pp. 87–115). Walnut Creek, CA: Left Coast Press.
- Scott, D. (1995). Colonial governmentality. *Social Text*, 3(Autumn), 191–220.
- Soares, D. (2006a). Género, leña y sostenibilidad: El caso de una comunidad de los Altos de Chiapas [Gender, wood and sustainability: The case of a community in the highlands of Chiapas]. *Revista Economía, Sociedad Y Territorio*, 6(21), 151–175.
- . (2006b). Mujeres, agua, leña y desarrollo: Estudio de caso sobre género y recursos naturales en los Altos de Chiapas [Women, water, wood and development: Case study on gender and natural resources in the highlands of Chiapas]. *Gestión Y Cultura Del Agua*, 2, 293–312.
- Sunderland, T., Achdiawan, R., Angelsen, A., Babigumira, R., Ickowitz, A., Paumgarten, F., & Shively, G. (2014). Challenging perceptions about men, women, and forest product use: A global comparative study. *World Development*, 64(Supplement 1), S56–S66.
- Tschakert, P. (2012). From impacts to embodied experiences: Tracing political ecology in climate change research. *Geografisk Tidsskrift-Danish Journal of Geography*, 112(2), 144–158.
- Twyman, J., Bernier, Q., Muriel, J., Paz, L., Ortega, L., & Koningstein, M. (2015). *Ensuring climate-smart agriculture is gender-smart: A participatory method for local adaptation planning with a gender focus*. Poster presented at Climate Change, Agriculture and Food Security (CCAFS) and International Center for Tropical Agriculture (CIAT), Cali, Colombia. Retrieved January 23, 2016, from <https://cgspace.cgiar.org/handle/10568/65655>

- Wajcman, J. (2010). Feminist theories of technology. *Cambridge Journal of Economics*, 34(1), 143–152.
- Weasel, L. H. (2004). Feminist intersections in science: Race, gender and sexuality through the microscope. *Hypatia*, 19(1), 183–193.
- Wetherell, M., & Edley, N. (1999). Negotiating hegemonic masculinity: Imaginary positions and psycho-discursive practices. *Feminism and Psychology*, 9(3), 335–356.