Born From Bears and Corn: Why Indigenous Knowledge Systems and Beliefs Matter in the Debate on GM Foods

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Introduction

Indigenous peoples do not share a common religion, but almost all share a history of colonialism and Christian missionization. In spite of legal and political colonial impositions, cultural practices relating to food production and consumption have been central to preserving and transmitting to future generations local ecological knowledge, social institutions, ethnic identity, and spiritual teachings. Food practices, including prohibitions, evince an extraordinary body of knowledge passed down over generations orally and through observation and participation. Today these practices have been increasingly threatened by a widespread transition from locally produced and prepared food to the consumption of marketed, globally sourced, refined, and processed foods [see Letourneau's chapter]. According to Debra Harry, Director of the Indigenous Peoples Council on Biocolonialism, genetically engineered foods represent to indigenous peoples worldwide both the extension of an on-going colonial destruction of their local knowledge systems and a violation or desecration of the natural world. (1)

A succession of declarations by indigenous peoples have identified appropriation of genetic resources and indigenous intellectual property as threats to their permanent access to and sovereignty over natural resources. The Declaration of Indigenous Organizations of the Western Hemisphere (Phoenix, Arizona, February 1995), asserted: "We oppose the patenting of all natural genetic materials. We hold that life cannot be bought, owned, sold, discovered, patented, even in its smallest form." The Ukupseni Declaration (Kuna Yala, Panama, November 1997), stated: "We reject the use of existing mechanisms in the legalization of intellectual property and patent systems… including intellectual property rights and patents to legalize the appropriation of knowledge and genetic material, whatever their source, and especially that which comes from our communities." Finally, the International Cancun Declaration on Indigenous Peoples (5th WTO Ministerial Conference, Cancún, Mexico, September 2003), demanded the polity to: "…stop patenting of life

forms and other intellectual property rights over biological resources and indigenous knowledge." (Source: Declaration on Indigenous Peoples' Rights to Genetic Resources and Indigenous Knowledge6th Session of the United Nations Permanent Forum on Indigenous Issues, May 14-25, 2007, New York, New York).

The relationship between colonialism and the biotechnology revolution was expressed, for example, at the United Nations Development Programme Consultations on the Protection and Conservation of Indigenous Knowledge in Sabah, Malaysia in 1995. Rosemary Coombe, professor of law and cultural anthropologist, reported that, "Asian indigenous peoples' deliberations put primary emphasis on self-determination," and asserted:

> The indigenous people's struggle for self-determination is a very strong counter-force to the intellectual property rights system vis-à-vis indigenous knowledge, wisdom, and culture. Therefore, the struggle for self-determination cannot be separated from the campaign against intellectual property rights systems, particularly their applications on life forms and indigenous knowledge." (Source: "Intellectual Property Rights, Human Rights & Sovereignty, Rosemary J. Coombe, Indiana Journal of Global Legal Studies, Fall 1998, 6. Ind. J. Global Leg. Stud. 59).

Vandana Shiva, an adamant critic of the GM "revolution," also sees biotechnology as an extension of colonialism, a process which trades largely on the ostensible supremacy of Western forms of knowledge. Shiva writes: "The duty to incorporate savages into Christianity has been replaced by the duty to incorporate local and national economies into the global marketplace, and to incorporate non-Western systems of knowledge into the reductionism of commercialized Western science and technology." (2) GM research from this perspective is an example and enlargement of this forced incorporation: "The colonies have now been extended to the interior spaces, the 'genetic codes' of life-forms from microbes and plants to animals, including humans." (3) In other words, "The creation of piracy through the piracy of other's wealth remains the same as 500 years ago." (4)

What Crosby has called the "Columbian Exchange" (5) – the global swapping of plant germplasm between the New World and the Old (6) – ultimately meant that every single species of economic significance in America has benefited from introgression of foreign genes. According to Jack Kloppenburg, over a period of about four hundred years, the world has seen a "global and unprecedentedly rapid movement of plant germplasm, a process that has been shaped in important ways by an ascendant capitalism committed to the creation of new social forms of agricultural

production worldwide". (7) And while germplasm from the South is considered "the common heritage of humankind," the proprietary technology of genetically engineered seeds bears a significant price tag. What entitles corporations to patent "codes of life" or the genetic sequences of plants and animals is the elevation and privileging of labor that generates profit, protected by intellectual property law, over thousands of years of collective, public improvement undertaken by indigenous farmers around the world.

Since most of the justification for GM food development rests on the promise of "feeding the world" – meaning the developing world, where the greater percentage of GM foods are *not* grown – and most "food insecure" people live in the Global South and therefore have been subject to colonial rule and could be identified as indigenous, these claims must be weighed against indigenous knowledge and belief systems around food. Therefore the discourses of development and hegemonies of scientific truth that prefigure and justify technological solutions to what critics argue are social, spiritual and political inquiries must be called into question here.

The first task of this chapter, however, is to adequately define the millions of people in the world regarded as "indigenous," and tentatively connected through the vagaries of history. The United Nations has defined "indigenous peoples" as: "communities, peoples and nations… having a historical continuity with pre-invasion and pre-colonial societies that developed on their territories, consider themselves distinct from other sectors of societies now prevailing in those territories, or parts of them." (8) It is difficult not to conceive of indigenous peoples in relation to colonial European conquerors or modern attempts at economic, social and political restructuring and assimilation. However, it is not helpful to think of indigenous peoples as opposite to an industrial, modern society, either. "Indigenous" connotes a *dynamic* people who are ancestrally, spiritually, and politically connected to a territory in a multiplicity of ways.

Although there exist differences among nations, and between indigenous peoples within nations or tribes, a common position among indigenous people globally is often indicated where matters of ecological health are concerned. For example, a questionnaire was developed by the International Indian Treaty Council (IITC) to elicit responses from indigenous peoples around the world focused in part on the relationship between traditional cultural practices and food systems. There were 128 respondents from 28 countries or states around the world. Findings showed that despite massive heterogeneity among participants, a common position upheld by indigenous peoples was the essential connection between traditional subsistence foods and practices to the maintenance of their respective community's culture. Biotechnology (including genetically modified organisms, or

GMOs) was cited as a current practice that results in negative impacts to their communities' traditional foods and food practices. (9)

Indigenous food practices are tied inextricably to sustaining ecological health, often through food taboos, prohibitions, and spiritual teachings that impart a respect for the integrity of the earth and its life forms. These complex forms of knowledge and socialities represent a worldview that integrates and informs community organization based on people's direct dependence on the natural world. These forms of knowledge are often referred to as Traditional Ecological Knowledge and Wisdom (TEKW). In contrast to conventional scientific paradigms, TEKW represents, "Practices of aboriginal people to maintain and enhance their lands, waters, and living resources [*sic*] derived from generations of experimentation and observation, leading to an understanding of complex ecosystems and physical principles." (10) The earth is not considered in this paradigm to be merely the property of those currently tending to its guardianship, but rather, for example, Mohawks believe, that it is to be managed with respect for the future generations (7 generations), as a common heritage. (11) Two central aspects of this ecological management and social practice are kin-centricity or "animistic" worldviews (Hunn 1999; Salmón 2000), and following that, a belief in and deep respect for the spiritual interconnectedness of all things. (12)

Although the concept is somewhat contentious in that there is no common understanding of what TEKW means and how it should be implemented in policy and public arenas, what seems clear is that TEKW forms a special category for research. Unlike with conventional science, this knowledge is understood "not as something separate from its possessors' lives, but as something integral to the individual". (13)

The authors selected two research methods we felt most effectively narrated *particular* indigenous perspectives on transgenes in food, rather than treating indigenous peoples as a unified entity. Lorenzo Magzul and Shiri Pasternak traveled to Guatemala to conduct focus groups in Magzul's hometown of Patzún with the local Mayan community. Nancy Turner sent out questionnaires to indigenous colleagues in North America. The questionnaires, as well as the Guatemalan focus groups, were designed to elicit responses regarding the role of traditional foods and food gathering practices in indigenous cultures. More specific questions were then asked about perspectives on the role of transgenes and GMOs in relation to traditional food-gathering practices and the belief systems in which they are embedded.

Case studies

There is little doubt that the current demand for resources by the global human population has gone beyond the Earth's carrying capacity. The depletion of resources and the need to produce more food for a growing population are key contributors to this demand. The pressure on the world's resources is compromising the food security of many people, especially those in developing countries. The typical scientific and positivist approach to address the consequences of the scarcity of resources, however well meaning, is that key measures such as investments, scientific research, transfer of knowledge and technology – presumably from developed to developing countries – will "ensure wise management of resources and sustained capacity for growth." (14)

In contrast to the scientific and positivist approach, and despite the incredibly rapid expansion of Western economic and ideological approaches to resource use, some indigenous peoples worldwide continue to utilize natural resources that achieve the same goals of "wise management of resources" and the ability to feed themselves, yet the means to achieve these goals are not drawn from scientific approaches, but include rituals, ceremonies and prohibitions. (15)

The ongoing challenge for indigenous societies, because of the expansion of Western economic, cultural and ideological perspectives, is whether they can maintain their own traditional belief systems and practices, not just for the sake of preserving them but also as a means of ensuring their own physical survival and the continuation of social and time-tested ecological relationships.

The case studies for this chapter focus on the town of Patzún, Guatemala and a cross-section of indigenous peoples, mostly scholars, from North America whose work is related in some ways to traditional food practices. Considering that corn (*Zea mays*), the most important food for the Maya, is one the major crops that the biotechnology industry has invested most in (16), it is appropriate and important to find out from the people themselves, their views on genetically modified foods. Their perspectives will help others to understand whether they accept consumption of GM corn and other crops, and whether measures such as labeling are sufficient to guarantee their rights to know about and have control over the foods they eat. Corn is also a central foodstuff for many other indigenous peoples of the Americas. Considering that Canada and the United States are major centers of food biotechnology in the world, corn and other traditional foods, as well as fishing, hunting, and cultivation of waterways and lands, may be susceptible to cross-contamination with GM seeds. Furthermore, in their day-to-day diets, Indigenous people may also consume a good deal of processed food containing GMOs.

Until recently, most farmers in Patzún have grown corn intercropped with beans (*Phaseolus vulgaris*) and squash (*Cucurbita pepo*), using low input and traditional methods. In the 1980s, crops such as broccoli (*Brassica oleracea*) and snow peas (*Pisum sativum*) were introduced as an economic development measure; today, these crops are cultivated with high inputs of synthetic pesticides and fertilizers. These characteristics of Patzún, where the modern western approach to agriculture converges with the largely traditional approach used by the local Mayan population (17), constitute an important rationale for focusing on this community and an opportunity to understand how the local people react to, think about, and accept or reject genetically modified foods.

Indigenous peoples in North America, owing in part to epidemics and colonial massacres that resulted in a massive population decline estimated to have killed around 90 percent of their peoples, as well as to a systematic cultural genocide that involved Christian residential schools and government appropriation of their traditional lands, face challenges of a more protracted colonization and assimilation. However, we are witnessing today the restoration and revitalization of North American indigenous cultures and the transmission of their knowledge of traditional food practices to the younger generations. In this light, GM foods represent a paradigmatic case for the conflicts between indigenous and non-indigenous worldviews. Those North American indigenous peoples we asked to respond to our questionnaire were known to us as people who have a specific interest in food. Thirteen people participated, including 6 males and 7 females. Of these, over eight different North American indigenous nations were represented, including: Cherokee Nation, Wasco (Warm Springs Confederacy, and other nations), Gwich'in, Métis, Mohawk, Haida, Nuu-Chah-Nulth (3 different communities) and Straits Salish (2 communities).

There is also significant research with indigenous peoples worldwide on the issue of GM foods. For example, the Maori of New Zealand, Zambian farmers in Africa, and Philippino *campesinos* all have strong movements of opposition to the technology, in an effort to maintain sovereignty over their lands and to protect the nature upon which they depend to subsist. (18) We have undertaken these focus group discussions and interviews to examine more closely such positions.

The role of traditional food in indigenous diets: sowing, cultivating and harvesting

The town of Patzún is a typical community in the rural highlands of Guatemala, with a large Maya population that has retained a distinct identity and speaks the Mayan language Kaqchikel. The majority of the Patzún Mayas are Christians – Catholics or Protestants; therefore, at times when the

participants refer to "god," it is not clear whether they are referring to the Christian god, one of their own contemporary conceptualizations, or a god of pre-Hispanic origins. Despite these ambiguities, the importance of corn for the survival of Mayans weaves through and interlocks their history from their origins up to today: "According to our culture, the food that sustains us is corn. This is our basic but necessary food. Often when we talk among ourselves, we comment that our stomachs are not made for other types of foods like bread [*from wheat* – Triticum aestivum]. We were raised eating corn, which our ancestors left us, and because corn originated from here, we can practically say that *we were born from corn*." [emphasis ours].

Corn is recognized as sacred, not just in its consumption, but also in the rituals, ceremonies, and blessings that accompany its sowing and harvest. Corn illustrates the historically indivisible meanings of corn as a food, a spiritual worldview, a form of ecological management, and a community practice: "Our ancestors have taught us that before you plant the corn, you have to go the field to give thanks and ask permission from the land. They taught us that the land has a god, its divine owner, so planting corn was not just a simple and free act, you have to give thanks and ask permission from the God. This is what I keep in my mind from the teaching of our grandmothers and grandfathers."

Descriptions of corn rituals also underscore a kin-centric worldview. Corn is described here not as an object, but in familial, animate relation as "our mother." Reciprocal obligations are thus involved: "Another thing that I have learned is that the day before the harvesting of corn takes place, the harvesters visit the field to be harvested; they take candles, burn them, and call on the corn so that they are in the fields on the day of the harvest. People say that our mother, the corn, may go wandering and leave the fields and may not be there on the day of the harvest. By visiting the cornfield the day before harvesting and asking our mother to be in the field on the day of the harvest, you make sure that all the corn is harvested and nothing is left on the fields. Also, some people… have a big meal once the harvest is finished – bring a live chicken to the field and slaughter it right there, cook it and then have a big feast; all this to give thanks to the land for the favor done for this year of providing food."

Until 20-30 years ago, the Mayans subsisted on their traditional diet. Changes in this diet mean a loss of ecological knowledge and rituals that teach respect for what the earth and their mother has given them: "These rituals are being forgotten because some people do not have time to practice them. The lesson of this belief is that all the corn must be harvested and nothing is to be left on the field."

A colonial critique also runs throughout the responses. The introduction of new lifeways and new foods have brought many problems for the Mayans: "The ***g'eka*** **[***white people and mestizos*] have tricked us into eating foods that they eat. We are now copying them, but these foods give us illnesses, we now have illnesses that in the past we did not have. We think that the white man's food is better, that it tastes better, but all it has done is give us illnesses." Dietary changes contradict the tried gastronomical knowledge of the Mayans, as well: "We do not eat like the ***g'eka***, who eat several types of food one after the other, we are not like them. We have been taught, and passed from generation to generation, that there are good foods, and for us the main food is the blessed corn, this is what sustains us." The notion of plenty, valued by consumers in the market society in the form of product diversity and "eating strawberries all year round," holds little stock with an elder interviewed in Patzún: "If we only had tortillas to eat, we feel we have enough food, even if we only have salt to eat with our tortillas. This is how we view things. For us, foods such as corn and beans are sacred, and we considered them as sacred seeds, which have been left for us by our ancestors."

All of the North American indigenous questionnaire respondents use traditional food (food that was eaten by past generations of their people) to some extent, and all of them indicated a preference for traditional food. Jaalen Edenshaw (Haida) emphasized why this was important to him: "It is important to continue gathering and eating traditional food because it is from the land, and we are from the land. It is important to know where your food is coming from, to kill it, handle it and prepare it. You get a respect for where it comes from and what it provides to you when you are a part of it." Those living away from their peoples' territories reported that they eat their traditional foods less often, though, because their foods are not available. This "food distancing" marks here a substantive break from cultural practices.

Environmental problems, industrialization, and settlement expansion due to population growth have affected peoples' ability to access traditional food, as well. As explained by Pakki Chipps of the Victoria, BC, Canada area: "I would like to use traditional foods entirely, but we have a serious shortage of them as the aggressive introduced plants erase the traditional food plants. We have traditional places where our food plants grew and where we would travel in order to gather them, but we no longer have access to these places, or they are just paved or damaged too."

All of the respondents indicated that food and dietary practices (19) were "important" or "extremely important" to them. They provided a range of specific details about cultural traditions relating to food gathering and use, from ceremonial practices around harvesting, to ways of caring for the food-producing areas. Alestine Andre, a Gwich'in woman from the Northwest Territories,

Canada, explained how cultural and spiritual practices, as well as ecological management techniques, are embedded in this knowledge of food gathering practices: "Respect must be used when harvesting or gathering traditional foods. Cultural practices must be followed on the land. For example, when collecting plant foods, the gatherer or harvester must give a token of thanks (wooden match sticks, tobacco, tea leaves, etc.) before they pick any parts of the plants including their berries. Care must be given to ensure there are food resources for the future."

Earl Claxton Jr., of the Saanich Nation, Vancouver Island, described the importance of salmon fishing for him, bringing to light the political significance of traditional food practices: "I think for me it is very important to go and catch the spawning salmon in the Goldstream River. This allows me to be visible to the general public while I am practicing my treaty right…."

Moreover, the respondents constantly emphasized the social aspects of food gathering, preparation and eating: "When you are preparing or cooking country foods, share some cooked food with an Elder, widow or widower, or another person…" (Alestine Andre). Another respondent illustrated the link between cultural transmission and food practices: "Like most families we eat together daily, however, when it is fishing season, we generally spend a lot of time with extended family, fishing, smoking and jarring fish, and eating fish with our grandparents, grand aunts and uncles, etc.… This is also a time when the younger ones are taught to do fish" (Tah-eh-soom-ca). Changing lifestyles have affected the ways in which people interact, though. One respondent described how since many people are no longer food gatherers because they are busy making money now, families spend more time apart.

In Patzún, the importance in food practices of spending time with others was also highlighted, as was the erosion of this tradition and the social forms of life that accompany the practice: "In our culture to eat with the family is very important, it is a special time… The family is a strong unit; eating together is very important because at this time we all share with each other how our day was and tell each other what sort of things we have been doing."

Foods for human consumption that are avoided because they are considered unacceptable

There were very interesting similarities between the nature of food taboos expressed by the Mayans in Patzún and by the indigenous questionnaire respondents in North America. For example, pregnant women were subject to many food prohibitions. In Patzún, "Pregnant women should avoid eating citrus fruits such as lemons [*Citrus X limon*], oranges [*Citrus sinensis*], pineapple [*Ananas comosus*], nance [*Byrsonima crassifolia*], and avocado [*Persea americana*]. These foods can cause abortion,

and some can result in allergies. For example, if a pregnant woman eats avocados her child could become susceptible to colds, running nose, etc. So pregnant women have to be very aware of what they eat, they have to look after themselves."

Another Mayan respondent spoke of food taboos for pregnant women in terms of animal consumption: "Something that we have been told about is that we should not feed chicken legs to a boy because this makes him not have the ability to climb a tree. Also, some people believe that if a boy eats chicken wings or if a woman who is pregnant with a boy eats chicken wings, when the boy grows up he can turn out to be violent towards his wife; this is because people believe that chicken wings can cause you to not think clearly, you can lose your head."

One respondent in the North American focus group, a young adult, noted that there were traditional food taboos, such as those around avoiding certain foods during pregnancy, but that her generation did not necessarily observe them.

Seasonal prohibitions were also a common feature and at times were also connected to pregnancy or lactation. Pakki Chipps noted that there were plants that could be used only during certain times of the year, for very specific purposes. She explained, "Some of the plants prohibited to young women, pregnant women and lactating women have contraceptive qualities that could harm the fetus. Some foods, if picked at another time than that specified as correct, would die out if picked at any other time."

The theme of kin-centricity also arose in the questionnaires. Jeff Corntassel (Cherokee Nation) and Taiaiake Alfred (Mohawk) both noted that people should not eat their own clan animal, and in particular, Jeff Corntassel explained from the perspective of Cherokee Nation, "Bears are our brothers – these people started as part of a now nonexistent Bear clan. They prayed to ask the Creator how they could best serve the people and the next morning, they were turned into bears. Eating a bear is like eating a fellow *Tsalagi*."

A point that cannot be emphasized enough here is that what is taken for granted in science as the *natural order* is called into question by indigenous worldviews on a deep epistemological level. Modern taxonomic systems reflect the historical contingency of scientific truths and the hegemony of these categories, when they delineate animal, human, and plant kingdoms. For example, Jeff Corntassel responded to the question of food taboos, that, "foods from the upper world (i.e. birds) should not be mixed with food from the underworld (i.e. fish). These boundaries should also be respected." This point also pertains to Jeff Corntassel's associations between creatures and "forces

of nature" in the world: "Rattlesnakes come from where Thunder (*U-hv-yv-da-gwa-los-ti*) resides in the West and should never be disrespected or eaten."

While some may be tempted to call these taboos and prohibitions *superstitious* – such as the Mayan belief that "young girls should avoid pineapple, orange, avocado and lemons as they can delay puberty, and they can interfere with their menstruation" – (thus unfounded and vestigial), this accusation is itself recognized by scholars as an increasingly outdated position. Not only have many of these traditional beliefs proven to be scientifically rigorous and significant discoveries (20), but the destruction of local knowledge systems around the world has often been done in the name of an advanced, superior science that has caused more damage than done good. For example, the synthetic pesticide DDT was first introduced as a miracle product for increasing agricultural yield. Decades later, it was discovered that DDT was accumulating in toxic levels in the water table, the soil and in the bodies of humans and animals and that it would take years, maybe centuries, for this damage to be repaired.

Pakki Chipps reinforces this point: "Some foods [taboos] may be just superstition, but as much of this knowledge comes from very wise ancestors, I am not about to discount it as superstition just because I don't always know the reason for the taboo. The knowledge of plants and their qualities is extremely ancient and was built upon for perhaps thousands of generations." She added, "I trust the ancestors far more than I trust the grocery store or the advertisers or the WTO."

The gesture here is to recognize science as a story *among others*, not as a hegemonic truth. This idea was eloquently stated in the Mayan study group: "What our ancestors believed in and have taught us is useful for us to survive; when we forget these beliefs, it affects our ability to survive." An important lesson here is that the colonial imposition of hegemonic truth has endangered these crucial knowledge systems: "Being exposed to religion [*Christianity*], which some of us may not understand well, has affected some of our beliefs. Sadly, beliefs that have been forgotten could be very useful for us now; but even if we wanted to recover them, it may not be possible because they have been abandoned for too long."

Thoughts about genetically modified foods and genetic material from unacceptable foods being introduced into otherwise acceptable foods

Common themes emerged in our surveys that captured the difficult ethical questions that GM foods pose to some of the most marginalized people in the world today. Articulated often as a set of oppositions, the desire to improve or perfect nature was weighed against the potential of unintended

negative consequences; the choice to accept GM foods was weighed against its current imposition; and the violation of cultural beliefs was weighed against the relentless demand of economic imperative.

In the North American respondent group, the majority (eight) rejected outright the notion of eating GM food under any circumstances. The introduction of DNA or genetic material from prohibited foods to otherwise acceptable foods through genetic engineering techniques was completely offensive to participants. From a political perspective, Taiaiake Alfred responded succinctly: "I do not like the idea of genetically modifying plants or animals to make them more marketable or to increase profits for corporations. I don't think they are poisonous or harmful, but I think that they disturb the natural balance and promote the overgrowth of capitalism and corporate power." Jeff Corntassel (Cherokee Nation) stated, "It would be unacceptable and a violation of *Ani-geel-ahgi* natural law," and Jules Chartrand (Red River Métis Nation) explained, "I say leave the Creator's work alone. I trust his work better, than man's alterations of his work." Pakki Chipps was most emphatic, bringing to bear, as many of the respondents did, indignation towards what was perceived as yet another project imposed upon indigenous peoples without consent, interlaced with concerns for the protection of nature and indigenous culture: "I would feel violated. But we have been raped culturally, linguistically, physically, mentally, so why not genetically too? I already feel violated knowing that the store-bought foods I am forced to buy because our traditional foods are not available are altered; for them to introduce genetic materials from plants or animals that are taboo would be yet another attempt at cultural genocide. Certainly, it would be the ultimate insult and sign of disrespect for our communities and traditions."

Another point to consider in the debate is the widespread kin-centric view that indigenous peoples have of the other animals and plants of the world. The relationships between people and other life-forms place GM food more in the same situation as genetically modifying humans. As Pakki Chipps argues, "We should not have the right to tamper with plants and animals, for they are people too!"

Jeff Corntassel explained his position for distinguishing the modification of sacred foods as a distinct issue: "If I know [that a food has been genetically modified], then I can make a better determination – it ultimately depends on what the food is. If it's a sacred plant like corn, for example, I won't tolerate any genetic modifications. If it's a domesticated animal, like a pig, I might tolerate some small modifications. Overall, I would tend to avoid these genetically modified foods and view having our own seed banks and hunting wild animals to be a form of resistance to the

arrogance of *Yonega* (white) genetic prospectors. *Tsalagi* principles for leading a good life urge our people to eat our foods from well-tended gardens. How can we call our gardens 'well-tended' if they are based on modifications of our sacred plants and derivatives of sacred animals?"

He also explained, that, "there are deeper cultural reasons for not eating these animals [*Tsalagi* foods] other than a slight modification in their appearance or livelihood. Modification of this type would only demonstrate disrespect for that animal or plant's role in giving life and further undermine the balance of natural law. *Tsalagis* have an origin story of *Selu* (Corn Mother) and *Kanati* (The Hunter)…. It is this balance of roles and responsibilities that keeps our communities healthy and vibrant. To interfere with these roles via genetic modifications is to threaten the well-being of our communities and future generations."

In Patzún, the question of transgenes in acceptable foods was also articulated in terms of the relationship between health concerns and cultural beliefs. For example, one respondent stated that: "I think that if we know that the foods have been genetically modified we would not eat them, especially those foods that affect our health and cultural beliefs. For example, if a pregnant woman knows that a food has genes from a rabbit or a dove she would not eat them."

In Patzún, the idea that GM foods can *improve* on nature is not always antithetical to God or the Creator's will; however, these changes must be approached in terms of principle: "I think is important to know about them [*genetically modified foods*] because I think that according to the scientists, the genetic modification of food is to improve the plant and animal species for our consumption. However, we are all conscious that we have our principles, some of which are very spiritual, and we know that God created things that are in themselves perfect. We have to stop and think about these new things carefully. In recent years, there have been new things that have been beneficial to us, but others have been harmful and have had negative consequences."

However, if one is given no choice over the consumption of GM foods, God or the Creator's will cannot be taken into account: "I will add that we always try to choose the foods we consume. We consume tomatoes [*Lycopersicon esculentum*], we consume fish, but we choose to eat them. If these two things are mixed together, then we do not have the choice. I think that genetically modified foods can be good economically for those who cultivate them; they can benefit the producer because these crops could yield more. But we have our principles, and we think that God has created everything in nature and we should respect what has been created."

Sacred foods, which can vary from nation to nation, were often cited as the most offensive foods to be genetically modified. They may be "perfect" foods, or gifts from the Creator, and they

may also economically and socially sustain a group for centuries. The reasons for such sacred status can confound a "rationalist" worldview. As Umeek (Nuu-Chah-Nulth) elegantly states: "Traditional foods are not limited to logic and mathematical precision but can be considered sacred and life bringing. The salmon is one such food. The salmon gives its life in exchange for recognition and honor, attributes not necessarily amenable to logic."

Such sacred foods and the natural processes that they represent and embody, though, are often pushed aside when economic imperative meets cultural beliefs. In Patzún, one community member stated that, "One of our main concerns with genetically modified foods is that they are the result of human intervention, that they are not the result of natural processes. To us the natural process is sacred and to interfere with it is not acceptable, so we think that genetically modified foods in general would not be acceptable for consumption. However, we also have to be realistic, especially in communities like ours, where many of us are poor and can only afford to buy certain things. Therefore, if in the future the only foods available here are all genetically modified foods, we would not have much choice but to consume them, even if we did not accept them, because we would not be able to go and look for other foods elsewhere, and probably more expensive. We do however feel that we should know whether a food is genetically modified or not."

Economic imperative was also cited in the North American focus group where two respondents indicated that they might consider eating GM food under some situations (for one, with reluctance, in a case of financial necessity). "However, I believe that in the end economic necessities will be the final determinant for consuming genetically modified foods. People starving will probably eat them, especially when our population numbers will be so high and food demand will be high." The broader economic context of GM foods was brought up when Jaalen Edenshaw expressed, "I've heard the argument that it is the only way to feed the poorer people of the world, but if GM foods are owned by private industry they will be trying to make a profit; where is the profit in the poor nations?"

However, it must be stated that despite reservations expressed about the science of GM foods, some indigenous peoples were open to considering beneficial aspects of the technology. Umeek (Nuu-Chah-Nulth) considered some potential benefits of GM products. He identified the following potential benefits to crops: enhanced taste and quality; reduced maturation time; increased nutrients, yields, and stress tolerance; improved resistance to disease, pests, and herbicides; and new products and growing techniques. For animals, he acknowledged that Genetic Modification could provide: increased resistance, productivity, hardiness, and feed efficiency; better yields of meat, eggs,

and milk; and improved animal health and diagnostic methods. Environmental benefits of GM products he identified were: "friendly" bioherbicides and bioinsecticides; conservation of soil, water, and energy; bioprocessing for forestry products; better natural waste management; and more efficient processing. And, finally, for Society at large, he noted that potential benefits include increased food security for growing populations. On the other hand, Umeek noted a range of concerns with GM products, relating to potential impacts on human and environmental health, to access to food and intellectual property, to ethical dimensions, to labeling, and to social justice internationally. Umeek summarized his views as follows: "Genetic modification, as with any process that involves transformation, appears to be a two-edged sword. One edge appears to be beneficial and the other edge dangerous and risky. Considering the incipient and risky nature of GM foods I think it unacceptable that the US… is not required to label GM foods and consequently there may be no way, at present, to gauge the long term effects on health and well-being of populations that are unwittingly consuming such foods."

In Patzún, farmers reflected that, "Given what you have said about genetically modified foods, to me, at first it appears that they may be good. For example, if we can grow tomatoes that are resistant to frost we could benefit a great deal if we produce a lot of tomatoes and we are able sell them; however I am concerned about their consumption, what would the consequences be? Would there be any health impacts? Would it result in illnesses?"

Labeling

In the North American focus group, all twelve respondents were emphatic that all GM food must be labeled, so that people can inform themselves and make their own choices about whether or not to consume these foods. One respondent noted, that, "the spirit of the food is changed as well as the nutritional content."

In Patzún, the focus group participants were also unanimous in their desire for labeling: "I think that if genetically modified foods are introduced here, they should be labeled and have a warning about their possible consequences. If you know that a food is genetically modified, it is your own decision to consume it or not, but if you do not know, then you do not have a choice and you cannot make your own decision. Maybe in places where these foods are being created, people there do not even consume them; maybe they are fed to animals." This last point has been raised in a famous case by African indigenous peoples, as well, pertaining to the issue of unlabeled GM food aid. While most North Americans eat GM foods in their diets daily, they consume GM corn in a

highly processed form, unlike whole grains that Guatemalans and others around the world eat three meals a day. (21)

The unknown long-term health risks of GM foods were cited, too, as mitigating factors in the desire to see GM foods labeled: "If we consume these foods, maybe a few years down the road we will suffer negative consequences. It is possible that we will not see consequences two to three years from the time we consume them, but over a long time, the consequences will appear and damage a person's health. Even now, I think we are suffering the consequences of modern things. Before our time, our grandmothers and grandfathers had a long life expectancy. The average life expectancy a long time ago was 100 years, then it became 80 years, then to 60; it has slowly been decreasing, and I think this is because the foods in our diet are no longer pure, they have been tampered with, and we use chemicals and interfere with God's creation."

However, due to the pressures of population, these people may not have a choice, whether or not there are labels: "I will add that our situation today is such that we have enough to feed ourselves, but given the rate at which our population is growing, in the near future we will lack food to feed ourselves, and at that time, we will need to find other ways to feed ourselves. Instead of starving, we may have to consume genetically modified foods. I think that at times of great need no matter how much warning we are given about the danger of consuming something we will still consume it."

Conclusion

Both the responses to the questionnaire and the discussion from the focus groups affirm that most indigenous peoples, because of their unique histories and interactions with local ecosystems, have distinct cultures, languages, religions, and social and economic organizations. Their food systems are likewise unique, and many indigenous peoples today strongly identify with particular culturally important foods, including methods of production and preparation, and customs observed in serving and consuming them. More than most members of society at large, indigenous people are embedded in the ecosystems that produce their food and often have a better appreciation of and direct experience with their food sources, whether harvested from the wild, or domesticated and cultivated.

Indigenous peoples' recognition of their embeddedness in and interdependence with the ecosystem leads most of them to hold a strong belief that components of the ecosystems are sacred, that is, that time and space and all living things that exist within them are things with which harmony

must be maintained, that they are not to be tampered with. This belief in the sacredness of most things provides directions to the way they conduct their lives as well as shapes their world. For many, the violation of the natural law through the interference in the natural process is unacceptable; therefore, the genetic modification of foods is unacceptable.

Through their beliefs and practices, indigenous peoples stress that their dependence on the ecosystem is both physical and spiritual. Ceremonies and rituals, at specific times and places, are conducted to present offerings to life forces of fertility, rain, plants and animals; they also are ways of communicating with the spirits of these life forces. For the Mayas of Patzún, corn is the mother, the lifegiver, and communicating with her before harvesting is vital for a good crop. Do genetically modified foods have a spirit with which communication can occur? For some indigenous people, human interference with the genetics of foods makes them "genetically mutilated," as one respondent calls them.

The holding of ceremonies and rituals at specific times and places assures effective communication with the spirits. The cornfield, the places where food is gathered or hunted, become the religious altar; the times of sowing, before harvesting, harvesting, after harvesting, gathering, fishing and hunting, become the time for worship and giving thanks. Will the cultivation, gathering or raising of genetically modified foods be conducive to ceremonies and rituals at specific times and places?

The types of foods eaten, or not eaten (taboos), during ceremonies, rituals and everyday life are observed for various reasons: to recognize the interdependence with the ecosystem, to respect and honor the wisdom of ancestors, to communicate and give thanks to the spirits of life forces, and to ensure human survival. In the case of the Mayas of Patzún, many of the food prohibitions concern the assurance of a good crop, a check on population growth and care for the unborn and future generations. Not knowing what genetically modified foods contain clearly affects the Mayas' belief of what foods should or should not be eaten.

There is a general feeling from the respondents to the questionnaire and the participants in the focus groups that genetically modified foods are unacceptable, not just for consumption but also because of how they affect the sacredness of the natural order. However, recognizing the socio-economic forces that propel the propagation of genetically modified foods, they demand the mandatory labeling of these foods so that at least people have the choice of whether to consume them or not.

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Endnotes

1) "Biopiracy and Globalization: Indigenous Peoples Face a New Wave of Colonialism," *Splice* 7:2 (January/April 2001), p. 3.

2) *Biopiracy* (Boston: South End Press, 1997), p. 2

3) Ibid, p. 3.

4) Ibid, p. 2.

5) Alfred Crosby, *The Columbian Exchange* (Westport, Conn.: Greenwood Pub. Co., 1972).

6) As Kloppenburg elaborates: "The New World supplied new plants of enormous culinary, medicinal, and industrial significance: cocoa, quinine, tobacco, sisal, rubber. More than this, the Americas also provided a new arena for the production of the Old World's plant commodities (e.g. spices, bananas, tea, coffee, sugar, indigo)." *First the Seed* (Cambridge: Cambridge University Press, 2004), p. 154.

7) Jack Kloppenburg, *First the Seed* (Cambridge: Cambridge University Press, 2004).

8) Sustainable Development Networking Programme (SDNP), "International Day of the World's Indigenous People." http://www.sdnpbd.org/sdi/international_days/Indigenous-people/2004/index.html.

9) *Final Report on an Indigenous Peoples' Initiative to Establish Cultural Indicators for SARD: Questionnaire on Indigenous Peoples' Traditional Foods and Cultures*. Distributed by the International Treaty Council (IITC) and submitted to the United Nations Food and Agriculture (FAO) Rural Development Division (SDAR), (August 25, 2003).

10) Nancy J. Turner, Marianne B. Ignace, and Ronald Ignace, "Traditional Ecological Knowledge and Wisdom of Aboriginal Peoples in British Columbia," *Ecological Applications* 10:5 (2000), p. 1276.

11) Ibid, p. 1276. Also, see see Haudenosaunee Kanienkehaka Mohawk Nation Roots of Citizenship, http://www.kahonwes.com/blood/citizen.htm; and see also, http://www.kahonwes.com/language/kanienkehaka.html.

12) Nancy J. Turner and E. Richard Atleo (Chief Umeek), "Pacific North American First Peoples and the Environment," in Harold Coward, ed. *Traditional and Modern Approaches to the Environment on the Pacific Rim, Tensions and Values* (Albany, NY: State University of New York, 1998), pp. 105-124.

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14) Rosamond L. Naylor, Walter P. Falcon, Robert M. Goodman, Molly M. Jahn, Theresa Sengooba, Hailu Tefera and Rebecca J. Nelson, "Biotechnology in the Developing World: A Case for Increased Investments in Orphan Crops," *Food Policy* 29 (2004), p. 16.

15) Nancy J. Turner and Fikret Berkes. "Coming to Understanding: Developing Conservation Through Incremental Learning," *Human Ecology*. In press, 2005. See also, Stephen J. Lansing, *Priests and Programmers* (Princeton, NJ: Princeton University Press, 1991).

16) cf. Naylor, et al. "Biotechnology in the developing world: a case for increased investments in orphan crop," (2004).

17) Lorenzo Magzul, "The Environmental Sustainability of Non-traditional Cash Crops in the Highlands of Guatemala: A Focus on a Maya-Kaqchikel community" (Masters Thesis, University of Victoria, 2004).

18) See the film produced by the Indigenous Peoples Council on Biocolonialism called *The Leach and the Earthworm* (2003).

19) The questions, more specifically, were on how the food is produced, how and where the food is bought, where the traditional foods are gathered or harvested, how food is prepared, how food is eaten, when and with whom.

20) Fikret Berkes, "Traditional Ecological Knowledge and Resource Management," *Sacred Ecology* (Philadelphia: Taylor & Francis, 1999).

21) Adam Bradbury, "GM Won't Cure Hunger in Africa," *Real Food News On-line Digest* (Friends of the Earth, January 2002).