

# We are IntechOpen, the world's leading publisher of Open Access books Built by scientists, for scientists

**4,800**

Open access books available

**122,000**

International authors and editors

**135M**

Downloads

Our authors are among the

**154**

Countries delivered to

**TOP 1%**

most cited scientists

**12.2%**

Contributors from top 500 universities



**WEB OF SCIENCE™**

Selection of our books indexed in the Book Citation Index  
in Web of Science™ Core Collection (BKCI)

Interested in publishing with us?  
Contact [book.department@intechopen.com](mailto:book.department@intechopen.com)

Numbers displayed above are based on latest data collected.

For more information visit [www.intechopen.com](http://www.intechopen.com)



## Food and Nutrition in Embera Indigenous People

Javier Rosique<sup>1</sup>, Aída Gálvez<sup>1</sup>, María Teresa Restrepo<sup>2</sup>,  
Luz Mariela Manjarrés<sup>3</sup> and Erika Valencia<sup>4</sup>

<sup>1</sup>*Group of Research: Medio Ambiente y Sociedad,  
Department of Anthropology,  
University of Antioquia, Medellín*

<sup>2</sup>*School of Nutrition and Dietetics,  
University of Antioquia, Medellín*

<sup>3</sup>*Research Group on Food and Human Nutrition,  
School of Nutrition and Dietetics,  
University of Antioquia, Medellín*

<sup>4</sup>*Group of Research: Medio Ambiente y Sociedad,  
University of Antioquia, Medellín  
Colombia*

### 1. Introduction

Feeding is a critical biological function and essential for social life. As a research topic it is multidimensional, ranging from biological to cultural, from nutritional to symbolic. It also includes a dimension from the individual to the collective, social and psychological (Fischler, 1995). Since functionalist studies, in the first half of the twentieth century, the cooperation in pursuit of food was highlighted as a determinant of the nature of social groupings and of the collective activity. Feeding is considered a priority need related to a set of structural and cyclical elements, establishing the availability and access to foods that interact and are immersed in the socioeconomic and political reality. Such reality set limits and a certain space. Food is a fact that creates an interacting set of social relationships, and also acquires a central position with respect to the challenges of society as a whole and the rural world in particular (Muchnik, 2004). On the other hand, nutrition, resulting from the feeding process, is the combination of events by which living organisms receive and use food to keep their functions, and to enable their growth and development, contributing to the social productive performance (F. Correa, 1988: 21). The anthropology of food and eating (de Garine & Harrison, 1998; Mintz & DuBois, 2002; Contreras & Gracia, 2005) is interested in both aspects and can support the pluralism of methods and perspectives in research.

Indigenous culture and society influence food habits in the selection of foods, the ways of combining them and of preparing them. Food is also part of the beliefs and of the identity and accompanies the indigenous development in rites to mark the human life cycle. However food contributes also to increase the opportunities for development, success in

education and to increase the human capital of peoples. Most of the indigenous peoples conserve their traditional life but have access problems to food, with few possibilities of obtaining quality food market and with high prevalence of chronic under-nutrition, usually higher than 50% in children and often obesity in adults (Kuhnlein, 2007). Colombian indigenous lands cover the 29.8% of the Country (PNUD, 2011) however the greatest part of them are in low productive lands of Orinoco basin and Amazonia, in deserts or are in national natural parks. Indigenous continue to claim for wider their lands because the continuous state of food insecurity. Food habits research including the preferences and the nutritional status of the indigenous peoples can help to know how to approach the objectives of development in the reduction of hunger and poverty (objectives of the millennium for the 2015). The sustainability strategies of their food system need proper education for obtaining and producing traditional foods and to get market foods of better quality than those that consume at the moment. As a matter of facts, it is in the field of food security, the reduction of children under-nutrition and the increment of autochthonous food production that makes sense the research on food and nutrition in indigenous peoples.

In food security, food habits are viewed as important determinants of the food system because they are closely related not only to culture and beliefs, but also to educational level, and to economic and social aspects associated with the ability to decide on how to select, store and prepare food. Decisions on food and diets, at household level, depend not only on the availability and access (economy) to foods, but also on the health status of people. That is why anthropology and health research can gather their efforts in fieldwork. However, eating habits can be explored from various disciplines in parallel, as shown by some researches on black groups in Colombia (E. Restrepo, 1996) where agro-productive aspects, food and health are treated by independent researchers. Integrated and multifaceted approaches on food habits and food security were also present, from the late part of the 1980's, in studies on indigenous in Colombia (Alcaraz et al., 1988; Duque et al., 1997; B.N. Restrepo et al., 2006). This chapter addresses this inclusive and multifaceted perspective on health studies and anthropology of food and nutrition of indigenous communities.

Amerindian food has stimulated the literature on the symbolism of food by means of a monosite approach, the symbolic perspective, where some authors complain that the exciting indigenous worldview comes to happening in a context of food insecurity and child under-nutrition (López, 2003). On the contrary, the multisite approach has a certain tradition in Mexican studies on food (Vizcarra, 2002), and studies on vegetarianism (García, 2002) and takes into account health and nutrition. But, other pluralistic and interdisciplinary approaches are rare because they present many challenges to successfully integrate the methodologies of social sciences and health.

Embera is the third-largest demographic Amerindian native group in Colombia, and belongs to Chocó linguistic family. During 2006 and 2007, there was a strong concern of some local agents of Government and Indigenous Organization of Antioquia (OIA, Organización Indígena de Antioquia) and international cooperation agencies due to the increase in infant mortality associated with infectious diseases and under-nutrition, as well as to the recurrent problems of food insecurity and sustainability of agricultural production projects in indigenous communities. The Program for Food Security and Nutrition MANA of the Government of Antioquia requested to obtain primary information on the achievements of the Program aimed to food complementation, one of the steadier programs

in Embera since years. The region selected was the municipality of Frontino (Figure 1) because since three years before there were some local institutions (Major Cabildo<sup>1</sup> and Local Cabildos) and the European cooperation (from EU) interested in food security problems of Frontino through the project PIBP (Proyecto Integral Bosque Pacífico) managed by OIA.

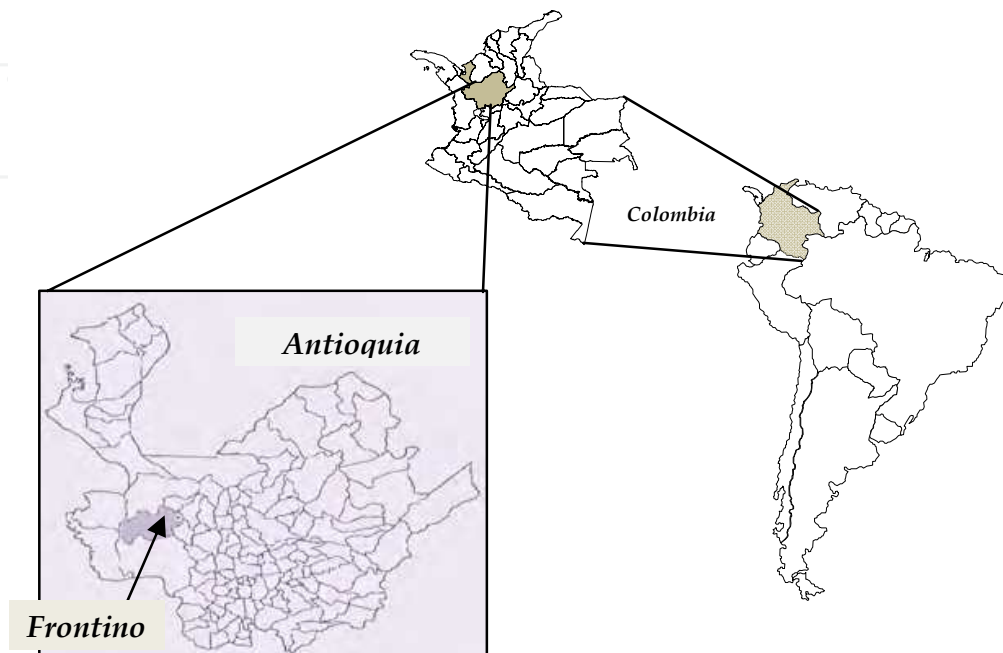


Fig. 1. Location of the municipality of Frontino in the department of Antioquia (Colombia).

The American Indians studied show specific eco-cultural models of achieving food, these distinctive features allowed a comparative study between the two Embera communities: the Oibida Embera from Atausí and the Eyabida Embera from Nusidó. The former has a dispersed settlement in the tropical rainforest, and a diet based on maize and banana with hunting, fishing and food collection in the forest and the latter lives near the town, Frontino, having a food pattern based on rice and the increasing dependence on exogenous food.

Writing food ethnographies of native indigenous people has not been a tradition in Colombian anthropology, and some aspects of Embera food habits should be traced by means of following the pages of other ethnographies, based on reproduction or on child care (Alcaraz et al., 1988; Gálvez et al., 2002) or historical perspectives (Pineda & Gutiérrez de Pineda, 1999). It has been documented a change in the Embera food system, as traditionally relied on hunting, fishing, gathering, diversified horticulture and small animal husbandry, allocating a surplus for marketing. The bulk of food supply problems are the past and present for Embera people. In the past, the kindred groups resettled themselves in other places when the environmental supply showed some depletion, and thus guaranteeing the availability of wildlife and land recovery. But in the span of the last 20 years, researchers agree on the deterioration of the Embera food system and the loss of

---

<sup>1</sup> *Cabildo* is a traditional institution lasting until our days for legal representation of Indian communities when addressing local issues facing the Municipality and the Government.

the ability to use space temporally, with diversified and shifting cultivation, due to the territory reorganization, the colonization pressure and the armed conflict (Arango et al., 2007). The consequences are shortage of agricultural land, reduced food availability, and the deteriorating nutritional status of population in the growth period (children and adolescents) and pregnant women.

There is a scientific literature on the effects of social stratification in Latin America on food consumption (Goloubinoff, 1996; de Suremain & Katz, 2009) as a result of colonialism and the consequences on the difficult access to meat for indigenous and lower classes. The problems of access to meat for the Embera indigenous population have been exacerbated by environmental degradation, adding problems when the population relies on hunting and fishing. Although communal land tenure protects them from the loss of property experienced by some Colombian peasants who are unable to meet its debts (PNUD, 2011), the indigenous territories do not produce enough meat because they stay with depletion of hunting and fishing and do not hold a great number of animals by difficulties in their care.

This chapter shows a methodological perspective on how to address the integration of ethnographic information on food habits and nutrition of Embera indigenous people from Western Colombia, assuming a plural perspective based on mixed models of research. Some critical steps in the research are described in section 2, the research highlighted ethical considerations in fieldwork to ensure the process of consultation to guarantee rights of the indigenous communities (section 2.1) and address the need of practicing multiculturalism when designing survey forms and when analyzing pilot test. Section 3 deals on the use of ethnography in the study of food habits and the integration of ethnography and quantitative methods like the 24-hours recall questionnaire and the anthropometric survey. The mixed method of triangulation of quantitative and qualitative results is presented to analyze the information gathered by the food and nutrition security survey, and to take into account a wide range of determinant variables. Finally, the authors show how this kind of pluralist research is an integrated new perspective on food and nutrition permitting a useful and deeper insight addressed to improve food and nutrition security in the communities.

## **2. Critical steps in the research on food and nutrition**

An interdisciplinary working group was organized by anthropologists (in the fields of ethnography of food and in biological anthropology) and nutritionists to manage the flow of information from qualitative and quantitative data. Defining common objectives in a multidisciplinary group of research was the first step because some researchers used qualitative methods, and quantitative the others. Qualitative research is often aimed to study food systems to finally understand society and people behaviour, but quantitative research focus on food and nutrition to understand health and sickness in itself. However, the theory of mixed-methods of research was able to provide a way to develop the project. Interdisciplinary researches rely on pluralism and triangulation (Olsen, 2004) or other similar mixed-methods. There are some critical steps in the design of a pluralist research on food and nutrition, mainly when biological data are collected: 1) the problem under study needs to be constructed by including the requests of the governmental agents, and indigenous representatives, 2) ethical consideration involves the consultation of the

indigenous leaders, permission achievement and a good design of the informed consent, 3) the processes of searching for translators and indigenous helpers, 4) the process of training people and the construction of a pilot test to prove and adjust field methods, and finally 5) building an intercultural perspective in all the steps of the research mainly in the translation of the survey forms and the application of measuring instruments for fieldwork.

The multidimensionality of food requires integrating knowledge of biological and social sciences, mainly because food consumption acts on nutrition, its physiological consequences and the symbolic aspects of the society (de Garine, 1988). The perspective of human ecology in anthropology followed by the authors explores the connections between adaptation to the environment and food choices, cultural diversity, and odd-adaptation in nutrition and food ways or lifestyles. This point of view gives to culture a key role in understanding the eating habits, and in that sense, is beyond biological reductionism that has dissociated the nutrition to the cultural environment where food needs are met. Anthropological studies on the nutritional consequences of cultural patterns of consumption usually include food distribution, but should be deepened on studying intra-cultural variations and nutritional status that express food preferences, and clarify issues as: why and how changes in dietary habits?, and the reason for the contrasts in nutritional well-being (well-nourished or malnourished subjects) within populations (Messer, 1995).

## 2.1 Ethical considerations

The present study had the support of the OIA. Since 1980, it represents all ethnic groups in the region: Tule (Cuna), Embera (Chamibida, Eyabida and Dobida) and Zenú, settled within the jurisdiction of 31 municipalities in the department of Antioquia. OIA is a key social stakeholder in the recognition of the modern status of these ethnic groups (Gálvez et al., 2002). In addition, *Cabildos* -as they are local organization entities- were consulted directly about time, mode and duration of the entry of the research team into their land and were aware on the goals, tasks and expected results. Health researchers are often concerned only by writing a good individual informed consent, however when working with native Amerindians in Colombia, there is a prior task: obtaining the permission of the traditional authorities mainly the *Cabildo*. As noted by Alcaraz & A. Correa (2006), research on indigenous peoples requires recognizing and respecting their cultural characteristics, in the consultation with local *Cabildos*. This enables the exercise of their autonomy to allow studies on health in their jurisdiction. Embera society has been only recently moved to reading and writing, thus informed consent it is not always the suitable method of being informed and to guarantee voluntary involvement. This is because this involvement often comes from the adherence to collective beliefs, thoughts and explanations expressed by the authorities who have the criteria to ask them, or not, on being involved in those activities concerning data collection. Identity is also expressed by means of the adherence to the project developed in their community. Before the interviews and before taking anthropometric data there is a need on explaining the objectives of the research and to remember voluntary participation. The research in Nusidó and Atausí did not implemented informed consent because in those years it was not recommended by the *Cabildo*. When a research in health cannot implement informed consents it is strongly recommended to follow carefully the Declaration of Helsinki promoted by the World Medical Association (<http://www.wma.net/>). However nowadays almost 95% of the research with Embera is developed by signing individual informed consents. After the explanation, the

translator reads the informed consent to the participant and makes him signing or putting the digital print (common for elderly), this is the time to answer the uncertainties, worries and fears on the research in Embera language. Then data collection will start with the participants.

In the first meetings with the authorities, some commoners, men and women were called by the *Cabildo* to be present and participate in the meeting to listen to academic proposals, with pauses for translation into Spanish, and proceeding to deliberate internally in their own language. Researchers collected and took in consideration concerns raised by leaders: "What will be left to the community? What would benefit the community?". These questions show how in the course of more than two decades of anthropological, social and community health researches in Colombian indigenous communities, Embera themselves have become aware of the dialogue with the academic researchers, booking a system to arrange exchanges. To deal with some exchanges, Embera often express their needs in expert support. Years ago, in our preliminary researches, they were afraid that University projects lasted a short time with no visible return because the scope of researchers is only collecting data. Nowadays, leaders are conscious that researchers should not only oversee the development of research, but they can help to overcome or improve weaknesses that have been shown by the research. Researchers could ask for council or assistants to other University departments, they can also ask for the help of graduate students that will remain in the community after data collection and after the reports point out weaknesses in food and nutrition. Our experience is on a good return of the expertise of students in communities, and this is a way of breaking into applications of their studies. Nowadays research of the University of Antioquia has a good acceptance among Embera people.

Some leaders are often called to attend meetings when a new research has to be developed with communities, but their wives are afraid the day of the meetings because they will not get the daily wage, or even worse because husbands neglect the family. The research team should take this problem into account when the leader who attends meetings depends on a daily wage. Some children of the leaders involved require more attention, because they spend less time with their parents or even may have low weight and low height for age because they grow with less care.

The Resolution 008430 of 1993 (Ministry of Health of Colombia) is the normative background that prescribes the steps to health research with people. In the classification of risks, the study was consistent with A category (no-risk), which excludes interventions on biological, physiological, psychological or social variables and individuals, and with B category (minimal risk), due to the use of surveys and anthropometric measurement. The classification of the research as A-B facilitates the acceptance by the indigenous community leaders and expedites the review of informed consent in the Ethics Committee of the University.

## **2.2 Constructing a research with indigenous**

Leaders chose five indigenous, 2 women and 3 men, aged 18 to 23 years to be assistants of the researchers. At the very starting point, they were permitted to make a personal choice about the commitments to develop. However the choice was somehow determined by gender, women preferred to work with us in the food security survey and men in anthropometry as assistants. This choice tended to favor the quality of data collection in a context that uses gender division to share specific and monolingual knowledge, often among females.

Surveys were translated into Embera language with the help of an indigenous. Translation is time consuming and in this research surveys were translated twice to the specific Oibida and Eyabida variants of the Embera language. The task goal was capturing the meaning and avoiding the literal translation when the literality was a limitation. Surveys were read and analyzed together with the translators. These were occasions to exchange views between researchers and indigenous about family organization, economics, health, and other issues. We realized on how different were Oibida and Eyabida in addressing questions on buying foods, this is because Oibida economy is scarcely linked to the money economy, due to the fact that they are more enrolled in a self-subsistence system. Thus, questions containing a monetary logic, were excluded in the surveys for Oibida, by the suggestion of the indigenous assistants. An important step in the translation was to explain questions in Spanish in different ways and, in addition, searching the redefinition of terms when necessary. This facilitated horizontal communication, which empowered the young assistants. During fieldwork, assistants discussed with researchers, as a focus group, the classification of foods and some recipes, to contrast the differential use of resources by their own ecological and cultural adaptation versus westernized adaptations.

Food is a large enabler of transactions between societies during the fieldwork in the tropical rainforest. The Oibida kitchen was perceived as an area of friction, especially among women. The women told to the indigenous assistant not to be able to cook food for us, the research team. This "failure" may be related to the lack of communicative intent of them with the others, a kind of covenant not-word (Le Breton, 2004). This hypothesis was partially confirmed by our ethnographic observations and versions of key informers with extensive knowledge of the Oibida world. It should be noted how the female assistant acted as a bridge between researchers and Oibida women, achieving on the one hand, to overcome insecurity in the culinary work, and on the other, permitting us the understanding/reading of the feminine universe of the Embera which is restricted to the private area with a limited contact with outsiders (Pineda & Gutiérrez de Pineda, 1999).

### **3. Ethnography, interdisciplinary and intercultural approaches**

Beyond building a framework for the desired ideal intake in contrast with the routine diet, ethnography was used as an input to the interdisciplinary approach because it provided an important information for the nutritional health assessments done by the nutritionists to determine the dietary intake by the method of 24-hours recall questionnaire (recalling the foods of the previous day), and also served to study the type and level of physical activity to calculate energy expenditure. Ethnography was used to capture a wide range of food preparations mainly on bananas/plantains, maize and wild food. Embera is an aggregating ethnonym it includes the word *bé* (maize) and it has been viewed as meaning people of maize. However, maize it is not the only axis of food habits because several types of bananas/plantains (*paddara* in Embera), *Mussa ssp.*, conform main staples and are present in the verb eating (*paddakodê*) in Embera language.

#### **3.1 Capturing and representing the ways of living and cooking**

Field-notes can be written during observation of daily live as meal preparation, but often it is done at night or early in the morning remembering the day before, because in the low Andean tropics, light goes away early and electricity is scarce or weak in Embera



settlements. Field diary is such a collection of field-notes based on memorizing the events of the day, it is registered by the ethnographer systematically during a period. In ethnography, the field-notes have to serve to feed a final document (Emerson et al., 1995) useful to get and understand the true perspectives of the subjects under study; although personal feelings and experiences of the researchers are always present in field-notes, due to the introspective character of writing and the cultural impact caused by thinking on other ways of living and feeling. The researcher wrote about his difficult adaptation to long walks always accompanied by the indigenous assistant, when pained for food restriction and did not find suitable water for human consumption. In this sense, he experienced and witnessed the social suffering caused by insufficient and deficient food, but also, the strategies practiced by Embera to face food deprivation. However remembering and other bias attributed to the observer are always drawbacks for field less trained researchers. For example, writing field-notes is always a reductive method, because registering talks in social settings and events requires paying attention and choose part of the relevant information for the objectives and discard the other. These problems deserve an accurate pre-field work to train your partners with enough reliability. Designing a pilot sample of field-notes based on a reduced number of households followed by a discussion of the results in the group of ethnographers is proved to be a good step before collecting the information. Field diaries helped to follow and describe hunger in Embera children, to collect data on dietary prescriptions during menarche and puerperium and to register food and drinks consumed during meeting of relatives and neighbors for funerals. Writing the field-notes about the experiences of intense participation during cooking in households, the record of roaming consumption of wild food during walks as usually do Oibida Embera people, and participating in community meetings where food is shared were constant tasks during 2007, except on July; the only requirement was to be present and involved in the community, living as a team with the Embera people. Walking stimulates the roaming consumption of wild products by the Embera group settled in rainforest. These snacks (usually fruit) are often undetected in the surveys based on 24-hour recall questionnaire, because it is focused on more or less structured meals. As found discussed in the literature (de Garine, 1980; Murcott, 1988), there is a *décalage* between the views of people about their dietary habits and the answers captured by the quantitative tools of measuring food intake. Starting from the three levels of Malinowskian ethnography, analysed by Kaberry (1957), can be designed some methodological strategies to control this *décalage* on fieldwork, and to gather the flow of information. Studies of dietary intake in groups of rainforest, must exceed the domestic scene, as the ethnic territory is often used by residents like food store. For example, agrasia (*Dollicarpus sp.*), also called "water vine", that grows in the woods, it is searched among Indians trekkers for its moisturizing properties, it is usually cut with a quick handling for pouring, in the mouth, the liquid contents.

### 3.2 Talking on food and preparations

Food habits determine the consumption of food and are of great importance in the characterization of the indigenous food security. They, were studied by age and vulnerability group (i.e., children under 5-y and pregnant women), and included the timing of food along the day, preferences, dislikes, dietary restrictions managing, daily feeding preparations and menus to celebrate special events and community meals. This

research took distance of reductionism and finalism of medicine and nutrition when studying to food habits and food practices. According to Fischler (1995), somewhere food habits have been described between mechanical and unconscious behaviors or "superstitions" deserving to be removed once the feeding facts would be clarified by nutritional science.

The system prescriptions and dietary prohibitions come to be intelligible by ethnography when food is analyzed in the context of become man and develop the Embera identity. In this sense, we must address the eating habits linked to child-rearing practices and cultural practices that shape the individual status through the life cycle. The analysis of the interviews to the women who were responsible to prepare meals was also an important instrument of representing Embera food system. Visits to households and *tambos* (wooden houses raised over the ground by posts) were complemented by semi-structured interviews with 40 key informants. To select key informants it is necessary to keep in mind the range of informants and approach them incidentally. Before, semi-structured interviews and before talking to the key informant, it is important to ask the permission of the interviewed to record the interview or to write down notes in order to make him feel confident and comfortable. Interviews were about different themes: dietary habits, production and access to food in households, children care and daily physical activity. Interview guides were prepared by each ethnographer depending on the themes or concepts that he had to ask. It can be captured: What does it mean "eating well" for Embera people?, by means of in-depth interviews (in French literature it is sometimes reported as lengthy interviews, Crenn et al., 2010). About the dietary ideal, what is the best to eat according to the natives includes always wild meat, fish, rainforest fruits, banana/plantain and maize in various preparations. However, the present alteration of primary rainforest ecology, mainly by reduction of hunting, fragmentation of the forest and the changes introduced by the colonizing species revealed the unsustainability of the food system together with the poor nutrition status observed from anthropometry.

Meals for Oibida from Atausí usually consist of a provision of plantains boiled with salt, served in a bowl from which anyone in the household can take to consume a portion. So long as there is banana or plantain, there is food, stressing its status as axial feed. Main preparations are categorized in Figure 2 depending on the community (Atausí or both Nusidó/Atausí) and the procedure (cooked, roasted or fried). Among usual preparations with banana/plantain four of them were associated exclusively to the rainforest communities from Atausí (*Sango, Chucula, Bilinguí or Biringuí and Valderrama*). However preparations of maize and plantains found in Frontino are present in other Embera communities from the north (Gálvez, 1993) and belong to common Embera food habits. Meanwhile, the recent changes in eating patterns have reduced maize preparations in the western regions and among the Eyabida from Nusidó; now the axial feed in Nusidó is rice rather than banana/plantain and maize.

Interviewers identified somehow the social and cultural pressures that influenced their behavior change: the need for wages or income for household expenses was an encouragement to seek work, the ecological constraints with shortages of the vernacular food, the proximity to food culture of the rural region of Antioquia and the acceptance of food assistance programs have encouraged the consumption of food items that were not previously present in their tastes and ways of food. Seeking for wages is a concern for

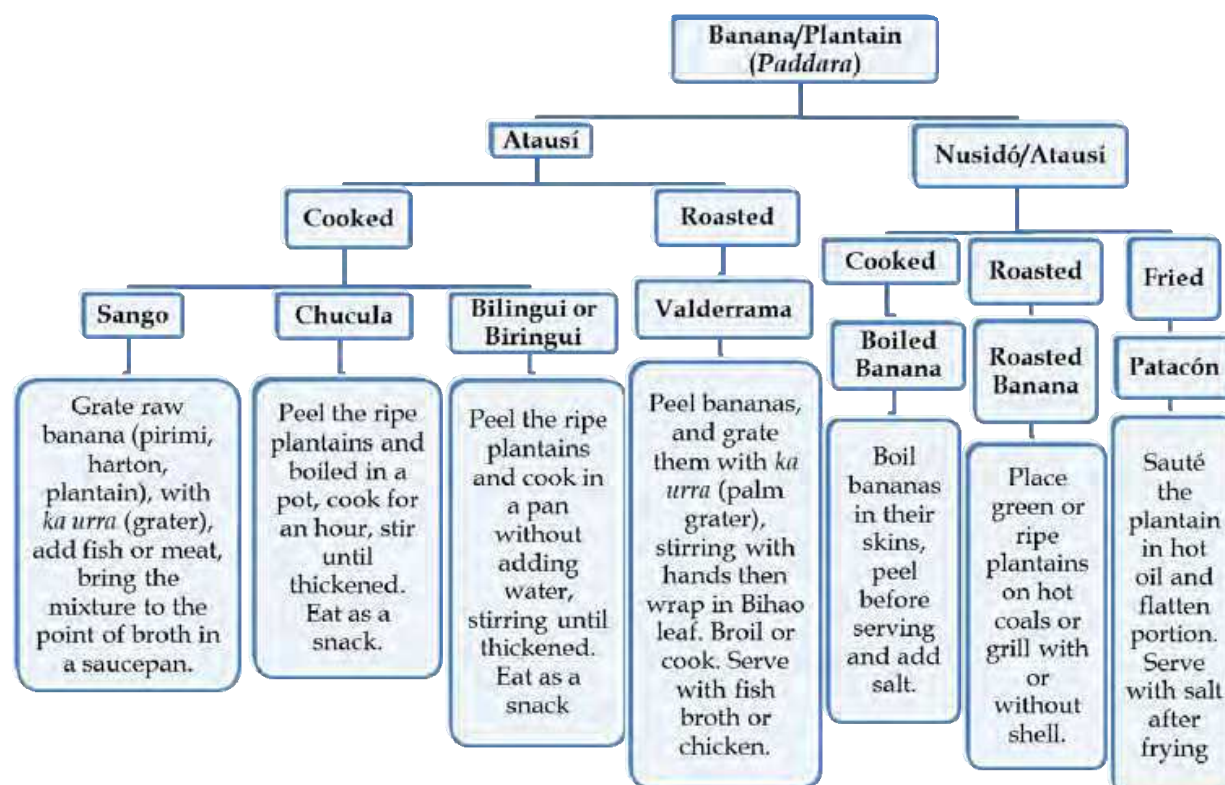


Fig. 2. Hierarchical classification of the preparations based on banana/plantain among Embera from Frontino in the rainforest community from Atausí and the Eyabida from Nusidó.

Indigenous from Nusidó. The speaker recalls lunchtime, and he reminded feeling ashamed of eating plantains, while other laborers coming from the neighboring village ate rice. The cultural pressures were also expressed by identity dilemmas like the experience of "learning to buy food". Thus, the fact of earning money entails the purchase of food, as an indicator of participation as consumers in society, unlike the self-sufficiency that has characterized the natives of the rainforest.

### 3.3 Adding surveys and constructing mixed-methods

This section will show how ethnography was integrated in specific steps during the application of the quantitative methods. Surveys, often called measuring instruments for fieldwork collection data, are sets of structured inquiries based on quantitative methods and often need previous validation to prove they are measuring what intend to measure (precision) with enough repeatability of results. Three surveys were done in each household: a) the food security survey based on demography, housing conditions and economy (income and expenditure) of the household b) the food intake survey based on a 24-hours recall questionnaire and c) the anthropometric survey to determine nutritional status based on indicators of public health (weight for height and height for age). Measuring instruments

(surveys) used in fieldwork were built in the early stages of the research by means of an intercultural approach.

### 3.3.1 The food security survey

The study of the impact of different forms of food and food production in the biology of populations is an ecological objective of anthropology. The adaptation enables sustainable development when the means and ways of life are facing crises and tensions linked to food production without compromising natural resources. Determining the degree of food security and nutrition in communities that share social, economic and cultural factors has a huge interest in the study of sustainable development. The food and nutritional security (FNS) is a state in which all people enjoy all the time an on-going access to food, in quantity and quality, needed for an adequate intake and biological utilization of nutrients, that guarantee a nutrition status that contributes to the achievement of their health and general welfare (Sociedad Latinoamericana de Nutrición, 1997). Food security refers to the ability to ensure food availability, whether the family produces or buys food in order to meet the needs of all members (FAO, 2006). Food security affects the nutritional status, health and family welfare, child school performance, production capacity, and the preservation of the environment (Rosique et. al., 2004).

Food and nutrition have a decisive influence, along with other factors, on morbidity and mortality of populations and their adaptation to the environment. Nutritional studies are relevant to identifying risk factors for planning food strategies and regional development, based on the needs of the population and desirable goals. Planning food and nutrition security can neutralize the possible misadaptation and promote strategies for sustainability. The study of food security is central to the collective welfare, when considers the assessment of nutritional status, since the breach in the balance between nutrient requirements and intake, is often present in Latin America, involving a cost in health (Alcaraz et. al., 1997, Rosique et. al., 2004). The axes that make up the FNS are (Tables 1 and 2): a) food availability b) physical and economic access to food, c) food consumption, d) biological utilization, and e) food safety (CONPES, 2008). Colombian studies based on food security surveys have been developed from other studies done in other Latin American nearby countries (Lareo et al, 1990) to measure availability and access to food. Surveys finally were validated for rural and urban Colombian populations (Álvarez et al., 2005). However, in the present study of Embera indigenous, researchers adjusted the survey by means of eliminating the scale of food security based on a scale of hunger (Álvarez et al., 2006) because the concept and also the application have problems of bias due to translation and intercultural perception. Moreover, the 24-hours recall questionnaire was in the place of the food availability section to substitute frequency of consumption of the standard survey. Ethnography, in field-notes, intended to get the representation of hunger.

### 3.3.2 Variables to characterize food security

The methodology for characterizing household food security, is based on the interview to the person responsible for preparing food, including questions about the food available at home (stored or just acquired in) to feed the family during the week preceding the survey. The responses are recorded in a layout that contains the name of the food, how it was acquired (purchased, grown, hunted, fished, received in donation or exchange, and so forth)

the amount (grams, litres), the number of people in the family, age and sex, and if there are pregnant or nursing mothers. In this type of food security surveys, the average energy and nutrients available in the home is compared to the recommended energy and nutrients for each family, finally it is calculated the adequacy or the deficit of energy and nutrients (Álvarez and L.F. Restrepo, 2003; Álvarez et al., 2004; Bernal y Lorenzana, 2001; Programa Mundial de Alimentos, 2006; Reyes et al., 2007). Moreover, variables in the study were more complex than in other studies because the research mixed qualitative and quantitative variables with ethnography (Tables 1 and 2).

Axis	Variables recorded	Main activities
Food availability	<ul style="list-style-type: none"> <li>• Food (amount and quality), Production in the gardens (<i>tajos</i>), bought in markets, hunting, fishing, gathering wild fruits, bartering, or by gifts and aid programs. Domestic animals (to be sold or to be consumed). Food for bait fish or bait traps to hunt.</li> </ul>	<ul style="list-style-type: none"> <li>• Talking with housewives.</li> <li>• Survey on food security</li> <li>• Visiting gardens around and behind households (<i>tambos</i>)</li> <li>• Walking with children for fishing</li> </ul>
Access to food	<ul style="list-style-type: none"> <li>• Economic capacity (balance of income and expenditures), when indigenous are involved in human labor. Educational level. Employment (wages).</li> <li>• Size and composition of households (pregnant, nursing mothers, dependents: children under 5-y, and elderly).</li> </ul>	<ul style="list-style-type: none"> <li>• Talking with housewife on labor, education, income and expenditures. Visiting stores</li> <li>• Survey on food security</li> <li>• Quantitative survey on family structure</li> </ul>

Table 1. Variables and activities developed to study availability and access to food.

The main constraint of the survey is, it shows only the average apparent availability of food (not actual intake) and it is dependent on the memory of the subject on the days before, moreover do not provide accurate information on the production of native traditional and foreign food, or of wild foods achieved and eaten, in situ. In contrast, this research on Embera used 24-hours recall questionnaire to measure food intake. Several researches in Latin America have been targeted at the perception on food security by the head of household or housewife, by means of a scale consisting of items related to the availability to buy food, the decrease of in-home meals due to lack of money and the experience of hunger in children or adults (Lorenzana y Sanjur, 2000; Álvarez et al., 2006). Perception of food security is described as categorical and does not include all axis of food and nutrition security. The application of scales to indigenous groups is difficult because the concepts of hunger and money economy have problems due to translation and intercultural consciousness. Hence in the present study were of limited interest and their goals were fulfilled by the ethnography of hunger.

### 3.3.3 The 24-hours recall questionnaire

In previous studies, to assess the intake of energy and nutrients in Colombia, by collecting information on indigenous, different methods of fieldwork have being used: the direct

Axis	Variables recorded	Main activities
Consumption of food	<ul style="list-style-type: none"> <li>• Food habits: selection of foods, menu, pattern of food consumption.</li> <li>• Food intake (quantitative).</li> <li>• Physical activity (daily activities to go to fetch food, firewood and water).</li> <li>• Beliefs on foods and special foods in the crucial moments of the cycle of life. Cultural preferences and food rejection.</li> <li>• The use of food aids. Feelings and approaches on food aid.</li> </ul>	<ul style="list-style-type: none"> <li>• Fieldnotes.</li> <li>• 24-hours recall questionnaire.</li> <li>• Observartion on cutting sugar cane and walking with Embera to visit relatives</li> <li>• Interviewing mothers on <i>puerperium</i>, menarche, and rites of passage for nubile women. Attending funerals</li> <li>• Following food aids from reception to consumption</li> </ul>
Biological utilization	<ul style="list-style-type: none"> <li>• Nutritional status.</li> <li>• Information on parasitism and respiratory illness or diarrhea.</li> <li>• Data on common diseases to fight against and their treatment by western medicine, or witchdoctors and shamans.</li> <li>• Data on physical, economic and cultural access to health services.</li> </ul>	<ul style="list-style-type: none"> <li>• Anthropometry and indicators.</li> <li>• Visiting hospital.</li> <li>• Interviews in day-homes for children, center for nutrition recovery and hospital. Fieldnotes on skin, clinic signs, and children behaviour</li> <li>• Talking with leaders</li> </ul>
Food safety	<ul style="list-style-type: none"> <li>• Data on features or procedures displayed to detect unfit food for human consumption.</li> <li>• Description of food chain from production to use. Handling and preparation, storage, utensils, quality of water for washing hands and home use.</li> <li>• Housing conditions and sanitation. Disposal of excretes and rubbish. Animal proximity.</li> </ul>	<ul style="list-style-type: none"> <li>• Interviews.</li> <li>• Fieldnotes on houses.</li> <li>• Observing ways and places to store maize and foods</li> <li>• Fieldnotes on housing conditions</li> </ul>

Table 2. Variables and activities developed to study food consumption, biological utilization and food safety

weighing of food with an electronic balance (Alcaraz et al., 1988), direct observation of household food consumption (Duque et al., 1997) and recording the frequency of food consumption in a week (Huamán & Valladares, 2006). But now there are new techniques that help to approach to the quantification of the amounts in food intake and thus the risk of nutritional deficiency (Nusser et al. 1996). The present study used for the first time in the country, the 24-hour recall in an ethnic minority: the Embera people. In 2005 it was conducted the National Survey on nutritional status in Colombia (ICBF et al., 2006), it included the 24-hour recall questionnaire according to the criteria used in other wide national studies in countries like USA, Canada, Mexico, Spain and South and Central

American countries, because it was considered a very flexible method to provide a wide range of results: the data can be analyzed as food groups (Figure 3), per capita consumption of food, consumption patterns and nutrient adequacy (Buzzard, 1998).

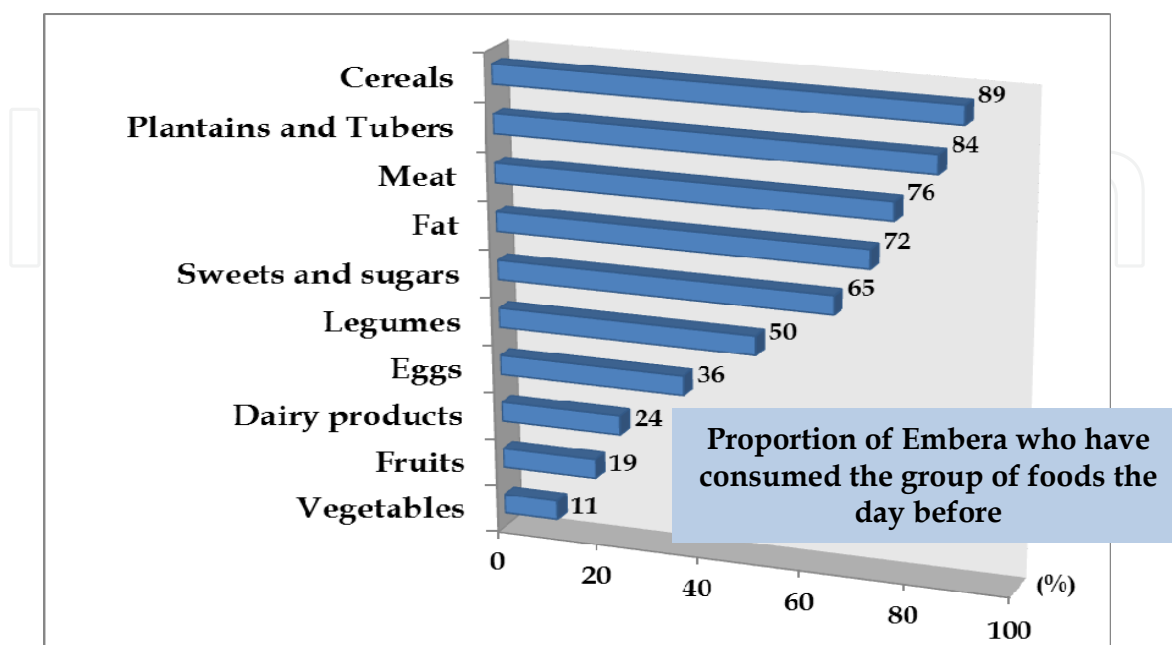


Fig. 3. Intake distribution by ten types of food grouping (following the recommendations for food analysis in Colombia) showing that Embera consumed less often eggs, dairy products, fruits and vegetables than cereals (as rice, and maize), plantains and tubers, meat, fat, sweets and sugars and legumes (as beans). However daily energy consumption was below the recommendation for 73.4% of the subjects of the communities.

The national study of Colombia did excluded indigenous people to measure food intake, because the poor specificity for ethnic minorities, the lack of trained translators and moreover the awareness that methods were not adjusted to indigenous peoples. The present study adjusted the technique of 24-hour recall in cooperation with indigenous assistants. This facilitated data collection and quantification of nutritional risk (Carmona-Fonseca et al., 2005; Rosique et al., 2010) allowing comparable information between Embera and the national study. The most important drawbacks needing for adjustments were: data collection is not always carried out by standardized nutritionists in procedures and error handling, because for the indigenous population, professionals do not have the knowledge of the language used in each community, and indigenous people are wary of strangers and hesitate to explain the consumption of certain foods such as birds, monkeys and snakes, among others; the communities live scattered and professionals need to travel across very faraway inhospitable areas, for what most of them are unprepared. To solve those drawbacks, two different strategy types can be used:

**Strategy type 1:** indigenous interviewers training (Figure 4). It is the strategy developed with indigenous from Chocó. During two weeks they frequented a theoretical-practical course for interviewers selected by indigenous leaders, with the following criteria: easy communication in both languages, writing skills in Spanish, enough recognition and community acceptance, willingness to collect food consumption data and getting permission from the *Cabildo*.



Fig. 4. Indigenous assistants in a session course on recording food consumption during the fieldwork done in the department of Chocó, with the help of Professor Luz Mariela Manjarrés (photo: Manjarrés, L.M.).

This requires full-training, like in the project developed in Chocó, and do not required other professionals to help in the interviews. Advantages of the strategy: interviewers can cover a wider range of communities, sparing time. Disadvantages: training required more effort to standardize all assistants to the same skills.

**Strategy type 2:** training both anthropologists and indigenous translators. It is the strategy developed with Embera from Frontino. During a fortnight professionals were trained in the technique of registering the 24-hours recall questionnaire. These professionals had a great capacity to adapt to the indigenous communities. The limitation is that they should always be accompanied by trained translators who ultimately capture the information to be passing to the anthropologist in order to be registered, in spite that some anthropologist know words and handle much information in Embera language. This kind of design required more trained people than the former. Advantages: more easily participation of the nutritionist and higher involvement in this strategy of fieldwork with the anthropologists. Disadvantages: households received more researchers and feel sometimes the pressure of the length of time consumed due to the need of translation.

In both strategies, a nutritionist with experience in the application of this technique is the trainer or surveyor of the process; he should use simple language, be friendly and be able to listen to comments and suggestions from the indigenous to make efficient changes to the explanations without affecting the quality of the information. During the training it should be taking into account the dynamics of learning of indigenous people, rather different from the *capunia* (non indigenous people). For this reason, the teaching methodology should be adjusted with some characteristics of the ethno-education to facilitate learning and achieve goals, such as the use of role playing, participatory meetings with short readings and the use of screenings. The nutritionist should share with indigenous students a procedures manual



which will detail, in a simple way, each of the steps to be taken into account to fill out the 24-hour recall questionnaire form, which is read and practiced. The training continues collecting interviews among peers and later among other Indians. The surveys filled must be reviewed by the surveyor and the same colleagues who verify the implementation of all manual criteria, afterwards the remaining doubts are discussed in group. This methodology helps to identify both successes and failures in collecting data.

The person in charge of food preparation helped to obtain information from other household members and answered duplicated surveys in two different days. This method is a standard one developed by nutritionists. The ethnographer helped to clarify the specific items consumed or the preparations by means of proper questions. He should ask on the items consumed on breakfast, lunch, dinner and inter-meals. Food supplementation or complements should be inquired on, during the survey. Among Embera, supplements were not frequently, but complements are almost always present due to food aids. After survey administration is finished the nutritionist check the answers with the help of the ethnographer to correct registering errors in the presence of the surveyed. The pattern of food intake is categorical and tends to summarize the most usual food items consumed by meal. The survey on food intake was completed by 353 subjects (198 in Nusidó and 155 in Atausí) in the first recall, and was completed by the 52.1% of the participants (n = 184) in the second recall, in non-consecutive days. Food quantities were estimated in the presence of those who prepared them, using models and geometric figures of defined weights, adjusted to food and usual weights previously listed for Colombia (Figure 5).



Fig. 5. Geometric models coded by weight, on the left side. Realistic models of basic staples on the right side, based on different types of beans and boiled rice (photo: García, D.)

To use those tridimensional models of food during the surveys, the interviewer ask always to choose the most similar form to that consumed the day before and writes down the code number of the form that is related to its standardized weight (Figure 6). For measuring liquids, a 500 cc measuring cup was used, due to the diversity of glasses and cups or other containers of liquids to drink or prepare meals.



Fig. 6. A moment of the interview done to complete the 24-hours recall questionnaire to choose the length of the plantains consumed the day before (photo: Valencia, E.)

The products with unknown weight were weighed on electronic scale. The record of quantities for each food was written in the recording sheets during fieldwork. The food intake data were entered into the Assessment Dietary Intake Software for the School of Nutrition at the University of Antioquia (Manjarrés & J. Correa, 2006) that gathers the information on food composition tables of Colombia (ICBF, 1988 ), Latin foods (FAO, 2002) and Hand Book 8 (Food and Nutrition Board, 2004). The software yields the net amount of nutrients for each 24-hour recall questionnaire and food consumption data by each subject. The nutrient data were transferred to be processed in PC-SIDE ver. 1.0 (Software for Intake Distribution Estimates, for Personal Computer) of June 2004, issued by the Statistical Laboratory of the Department of Statistics of the Iowa State University, Ames IA, U.S., to make the statistical adjustments to normalize the distribution of nutrients. The normalization is needed because of the variability of the intake, to generate the total energy and nutrients intake by day. Results are discussed in section 3.4.

### 3.3.4 The anthropometric survey

Anthropometry of height and weight needs a phase of preparation in Laboratory for training anthropometrists in order to learn measurement protocols (M.T. Restrepo et al., 2006), develop a good control of errors and keep the whole test within a reasonable time length. The obtained TEM (Technical Error of Measurement), during the measurement of the same proving subjects during two days, were 0.35 cm for height and 0.20 kg for weight. As these values represent the intra-measurer error they were considered acceptable while inter-observer error was less than 1% and measurer kept steady errors during fieldwork. Those requisites of error control were maintained when measurements were taken at the *tambos*, by taking into account a rule of tolerances between two repeated measures in order to discard the outermost second measure to ensure the quality of the data (maximum tolerance was 0.5 cm for height and 0.20 kg for weight).

For the weight of children under-four a hanging scale was used, with a capacity of 30 kilograms and accuracy of 50 g; for above four and for adults, weight was recorded using a portable digital scale (TANYTA) of 50 g of accuracy. The length of under-two was measured with a portable infantometer and the height of above two years and adults was measured by means of a Siber-Hegner anthropometer, all measures taken up to the nearest millimeter. To ensure reliability of data, research supervisors were used to conduct visits to monitor the quality of measurements and to validate the survey sheets during fieldwork. Nutritional indicators were height for age, weight for age, and weight for height for under 10-year children and BMI (Body Mass Index) for adults and adolescents. The construction, use and meaning of indicators was described in Rosique et al. (2010). A small group of subjects from both communities (Nusidó and Atausí) showed reluctance against taking anthropometric measurements, because when the measurer was female, some Embera males were reluctant to permit to take measures on the body. This was also recently observed in fieldwork during an anthropometric survey in Wayuú people located in the northeast of Colombia (La Guajira) during a survey on occupational health and safety promoted by a coal mine enterprise (Rosique, 2010). There is a gender perspective in relation to indigenous body culture. Only few shy under-twelve refused body measurements, in spite of the candies offered by the anthropometrist and the jokes. Some Embera taboos appeared also in elderly people, since they consider the process of measuring with the measuring tape presages death, because this procedure simulates the measurements made by those who select the suits size and the coffin for burials.

### 3.4 Considering triangulation

Although triangulation is at the ending steps of the study, and it is involved in the data analysis, the application it is only possible when some common unit of analysis is defined by each discipline. The same unit of study to analyse dietary patterns was considered by the researchers whatever the method of data collection employed (qualitative or quantitative): the household, it was defined by the set of individuals belonging to a nuclear family, an extended family or a group living under the same roof, which produces and also achieves food, which shares by regular time lapses, in the same fire, the preparations resulting from the joint effort. In ethnography, defining a unit of analysis is not enough because the household has always its network of relationships and, furthermore, because there are other settings of food availability: the commercial establishments, food assistance programs offered by the Government in the school, domestic areas and other food assistance events.

Triangulation can be applied to study economic pressures on food acquisition, food intake and nutritional status. The need of basic feeding is a pressure for Embera families when seeking to emigrate during the year looking for a job. Migration of men was not found as a result of hunting, because it happens to find job. High fecundity is also a pressure to search more food for households because 53.9% in Atausí and 49.3% in Nusidó, were under 15 years of age, dependant elderly (> 65 years) were not as much as children and young (less than 2.7% in both communities). However, preferred jobs are manuals and take place in farming (sugarcane cutters) or mining (gold extraction) because illiteracy is 69.4% in Oibida from Atausí and 51.1% in Eyabida from Nusidó (being these differences significant,  $\chi^2 = 12.27$ , 1d.f.,  $p < 0.001$ ). Median household income in Oibida was almost three times lower than in Eyabida. In both communities the majority of weekly expenses were for food.

Food production is low in Embera grounds. In both communities grow some foods such as banana/plantain, maize, cassava (sweet) and sugarcane (only in Nusidó) and raise small animals for consumption or sale (mainly pigs). However, the animal protein availability hang often on hunting (individually or collectively depending on the wild animal), this activity is highly respected even if the animals have declined by deforestation. Fishing is favored by the proximity of water courses, despite the reduction in number and catch size.

In Oibida from Atausí, housing is *tambo* (Figure 7A), it is made of palm leaves (hut of conical roof, no walls, and few divisions) raised over logs about 1.6 to 2.0 m above ground. While in Eyabida of Nusidó, house is mostly made of *bahareque* (walls based on cane, sticks and mud), or brick and mortar in deteriorating conditions and humidity. Few homes have latrines and there are no toilets, even if it had there were not used because they are alien to the Indian habits. In both communities there is overcrowding in the home and live with animals. The space for pigs and poultry is under the house or very near it. There is not available drinking water and human excreta deposition is in the courses of water. The wastes are dumped into the peripheral area.



Fig. 7. (A) *Tambo* in Atausí made of palm leaves, canes and wood, with conical roof, no walls, and raised over logs (photo: Valencia, E.). (B) Woman carrying a basket of green plantains held by his forehead (photo: Higuita, J.C.). (C) Preparing the fire in the upper floor for cooking (photo: Valencia, E.).

The dietary ideal of the Embera people relies on wild animals, cooked green plantains, ripe plantains roasted (in units or in a sweetened beverage), fish, beans and preparations of maize. In practice meat preparations are not always available for the reduction of hunting

and fishing. The ethnography of indigenous cuisine revealed common staples such as *arepa* (maize cake flat moulded by hand and baked), *mazamorra* (dense liquid prepared from cooked grains of maize from a kind of porridge) and varieties of *chicha* (a drink with different levels of maize or sugarcane-based fermentation) used in shamanic ceremonies and provisions for travel. Intercultural contact has introduced rice, tinned sardines, sparkling soft drinks, and bakery products, now indispensable in the diet and witnesses that food habits have changed and provide higher costs.

Commonly consumed foods, present in the Embera dietary pattern, were (in order of frequency of consumption in one week) vegetable oil, *panela* a variety brown sugar, banana/plantain, rice, maize, beans, fish, eggs, potatoes and chocolate. Food aids make available some complements (milk, biscuits and other foods provided by governmental institutions). The low intake of fruits and vegetables observed (Figure 3) was more acute in Oibida. However, they consumed more frequently plantain than Eyabida and had a lower percentage of individuals consuming legumes, sweets, fat and eggs. For Embera energy intakes come mainly from cereals and tubers. The average intake of total energy was 1578.6 kcal/person/day, but 50% of the community did not reach that average. The impaired percentage of population below the recommendation for Colombia in energy intake was 73.4%. The Oibida from the rainforest presented greater impairment (84.5%) than Eyabida (65.2%) and women had more cases of deficiency (<90% of the recommendation) than men. Daily physical activity and energy needs for women can be high due to long walks and work for food supply. Women often carry baskets of bananas or plantains held with a piece of cloth by his forehead (Figure 7B). They raise the basket up to the upper floor of the *tambo* and prepare the fire to cook the load (Figure 7C). Deficiency of energy intake increased with age from 0 to 18 and decreased after that time. The prevalence of the risk of protein deficiency affected a third of the sample with no significant differences by sex and a greater impairment in Oibida. There was a lower risk up to 8 years and an increase from 9 onwards. This increase happens at the same age when studying the prevalence of risk deficiency in the usual intakes of vitamins and minerals except for calcium deficiency which was at the same level in all ages (Rosique et al., 2010).

The prevalence of chronic undernutrition in boys and girls under 10 years, was 68.9%, increasing with age from 2 to 9 years, it was higher than in the Oibida community of the rainforest than in Eyabida ( $\chi^2 = 7.681$ , 1 d.f.,  $p < 0.01$ ) and in boys than in girls ( $\chi^2 = 5.562$ , 1d.f.,  $p = 0.018$ ). There was no wasting in weight for height in under 10-years children because the Nutrition Recovery Centre can succour extreme cases of Frontino or they died in the months previous to this study. However in under 10-years children there was a prevalence of 33.3% overweight. In young people aged 10 to 19 years low height prevalence was 77.1%. Overweight was higher in young women than men ( $\chi^2 = 7.13$ , 1d.f.,  $p < 0.01$ ) and obesity was only present in Eyabida community (7.8%) and absent in Oibida. In adults (> 19 years) had 54.1% normal weight, there were no obese subjects and overweight was more frequent in females ( $\chi^2 = 10.66$ , 1d.f.,  $p = 0.001$ ).

Nutritional health of the Embera from Frontino has similar problems of under-nutrition as in other Embera communities (Arias et al., 1988; B.N. Restrepo et al., 2006), other ethnic groups of Colombia (Carmona-Fonseca et al., 2005) and Latin America (Huamán & Valladares, 2006) where high nutritional vulnerability is present. However the prevalence

of under-nutrition in Embera is high with respect to other similar Latin American studies (Rosique et al., 2010) and obesity is not present in adults. The vicious cycle of inequality and poverty has deeper consequences for Embera health. Nutritional findings were of great concern to various stakeholders groups, including the community, because food insecurity has been present for a long time. Deficiency in dietary intakes of energy, protein and micronutrients along with the demand of energy expenditure, show the nutrition stress due to starvation, linked to a growing acculturation. The analysis of ethnographic data show that Embera feel a distance from the culturally desired food system, they persist in pending the ideal diet upon hunting, gathering and harvesting in their gardens, despite the profound changes in the ecosystem, the depletion of wildlife and land scarcity.

The reception of food aids from Government and international cooperation, it is common only in some more accessible communities, like Nusidó. Although the political discourse of Embera leaders emphasizes the autonomy and food sovereignty, many communities depend on food aid donations to survive. Yet aid has a biological demonstrable effect on nutrition status, as well as the functioning of Nutritional Recovery Center (NRC) established by the local Government. However, food restriction in Embera people is not finished, it is of long-term and has a multi-causal nature: in some communities it results from poverty, lack of opportunities for education and health, poor infrastructure, environmental degradation, low production of food, and in other cases, results from their location near the areas where there is the long-lasting Colombian armed conflict, or inside remote and inaccessible regions that maintain the status of protected natural areas.

Since 1991, Government implemented in Nusidó a program based in home-days for children aged 2-5 years, daily food-assisted by a trained woman in charge. They call her the communitary-mama. Recipients at communitary homes spend much of their time to guarantee four meals a day, and leisure and school activities each week for nearly 10 months a year. The menu provided to the beneficiary population is a standard type for Colombian culture. However in indigenous people it encourages the increase of western food consumption, like rice, sweetened beverages, fruit juices, milk and salads. This could affect the early accession of children to a contrasting food repertoire with regard to their own household cultural practices, within which the substitution of banana/plantain and maize by commercial rice is considered irreversible for ethnographers. Indigenous raised in communitary homes will develop a food culture more similar to the rural Colombian culture.

#### **4. Conclusions and new perspectives**

Researches addressed on pluralism, interdisciplinary and intercultural approaches need initial steps on steering at common goals and a clear interacting methodology, based on mixed-methods. Recent development on methodology argued that quantitative and qualitative tradition should not have a separate-but-equal status, and should instead interact (Olsen, 2004). The information and findings of the desk study integrated with primary data collection analysis help to triangulation and to depict a more comprehensive study. During project design, emphasis should be done in the selection and training of researchers and indigenous assistants for fieldwork. However, desk study is needed to define theoretical

frame, sampling, mixed-methodologies and how to use ethnography. Many steps of the quantitative research interact with ethnography mainly during the application of instruments of data collection.

Nowadays there is a need for pluralism in research to construct a different reading of the Embera food insecurity. New perspectives are needed in the context of biological and psychosocial stress being experienced by the community. In this context, in the last decade, suicide has increased among young Embera, of both genders, it is difficult to face such a dramatic event in populations of small scale like this. The team was hit hard when one of the five indigenous helpers hanged himself days after leaving fieldwork. There is not enough attention to suicide, in terms of its biological and social potential triggering causes. It is alarming the diminishing average age of the suicide cases in the Embera people. The emergence of potential nutritional constraints associated with *delirio da fome* (madness of hunger), or similar syndromes, should be studied in the short term in Embera population. There are few studies on this topic in Latin America, nevertheless it is remarkable the study of Scheper-Hughes (2001) in Brazilian populations of the Northeast.

Studies on food security and nutrition in Embera communities are scarce, perhaps because the difficulties of the language and because they often are located in remote parts with lack of infrastructure. However nutritional health and food security in Embera are far from optimal. Food insecurity arises from a set of causalities, traditional food habits are no longer sufficient for adequate subsistence. The ethnography of food has the power to suggest that the food ideal of hunting and fishing is unsustainable and outdated compared to the current food system. Thus, the communities have been forced to reduce the amount of food in the diet and include exogenous feeding products higher in energy and lower in protein, vitamins and minerals, as a result of an increasingly food acculturation. The cumulative chronic under-nutrition during the growth period in Embera children may also show the adverse food environment that accompanies the indigenous life.

Investment in food assistance programs have not had the expected impact in Frontino but have alleviated some nutritional problems in under-10 year children from Nusidó and were absent in the community of rainforest from Atausí. Although food aids afford limited food complements they had a certain impact on Eyabida because the prevalence of deficiency of energy and nutrients increased from 9 years onwards, when children receive almost no food aid. The challenge is to review food aid programs, and circumstantial supports, in order to make them consistent with the conception of "the Embera good living".

## 5. Acknowledgement

This project was supported by the Institutional Agreement CI 567-2006 of the Government of Antioquia (Mana Program), the Research Group on Environment and Society (*Medio Ambiente y Sociedad*) enrolled in the CISH (University of Antioquia), and the Indigenous Organization of Antioquia (OIA), with partial support from the European Union (EU) and finally by the Research Group on Food and Human Nutrition (University of Antioquia). Furthermore, the research participated in the 2011-2012 Sustainability Program of the Vice-rector Council of Research at the University of Antioquia, designed for supporting groups of research. The authors are also strongly grateful to the assistants who helped in

the fieldwork Germán Ariel Marin, Laidy Diana Arias, Juan Camilo Higueta and Johanna Santa, as well as to translators and indigenous helpers Luz Amparo Domicó, Nelson Majoré (†), Lino Domicó, Euclides Carupia and Silvia Domicó.

## 6. References

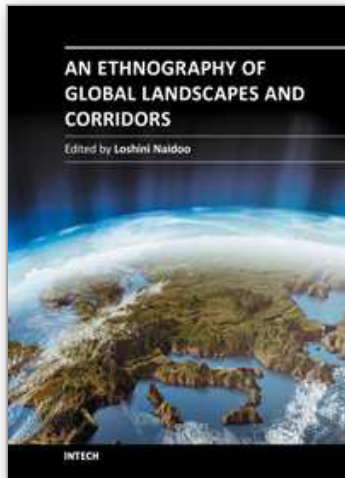
- Alcaraz, G. & Correa, A. (2006). La ética en la investigación: el caso con los tule (kunas) de Urabá, Colombia. *Colombia Biomédica*, Vol.26, No.1, pp. 9-21, ISSN: 0120-4157
- Alcaraz, G.; Arias, M.M. & Gálvez, A. (1988). *Situación de Salud Materno-infantil en Asentamientos Embera. Dabeiba, Antioquia 1985-1986*, Un-published research report, Colciencias, Universidad de Antioquia, Medellín, Colombia
- Alcaraz, G.; Bernal, C.; González, G. & Arias, M.M. (1997). Oral rehydration with a plantain-fluor based solution in children dehydrated by acute diarrhoea: A clinical trial. *Escocia Acta Paediatrica*, Vol.86, pp. 1047-1051, ISSN: 0803-5253
- Álvarez, M.C. & Restrepo, L.F. (2003). La variedad de alimentos disponibles en el hogar. Metodología para identificar vulnerabilidad a la inseguridad alimentaria y nutricional en hogares campesinos. *Revista de Salud Pública y Nutrición Respyn*, Vol.4, No.4, ISSN 1870-0160
- Álvarez, M.C.; Benjumea, M.V.; Roldán, P.; Maya, M. & Montoya, E.C. (2005). *Perfil alimentario y nutricional de los hogares de la región del Urabá antioqueño*. Gobernación de Antioquia, Dirección Seccional de Salud, Programa de Mejoramiento Alimentario y Nutricional de Antioquia, Universidad de Antioquia, Escuela de Nutrición y Dietética, ISBN , 958-9772-04-8, Medellín, Colombia
- Álvarez, M.C.; Estrada, A.; Montoya, E.C. & Melgar-Quiñónez, H. (2006). Validación de escala de la seguridad alimentaria doméstica en Antioquia, Colombia. *Salud Pública de México*, Vol.48, No.6, ISSN 1606-7916
- Álvarez, M.C.; Rosique, J. & Restrepo, M.T. (2004). *Seguridad alimentaria en los hogares de Acandí: La disponibilidad de los alimentos como indicador de suficiencia alimentaria*. *Revista Chilena de Nutrición*, Vol.31, No.3, pp. 318-329, ISSN 0716-1549
- Arango, J.U. & Zuluaga, G.P. (2007). Seguridad alimentaria desde una perspectiva de Gestión Ambiental en territorios de comunidades embera del Atrato Medio Antioqueño. Medellín: Organización Indígena de Antioquia, Fondo Indígena
- Arias, M.M.; Alcaraz, G. & Gálvez, A. (1988). Situación de salud materno-infantil en asentamientos embera Dabeiba- Antioquia 1985-1986. *Investigación y Educación en Enfermería*, Vol.6, No.2, pp.13-33, ISSN 0120; -5307
- Bernal, J. & Lorenzana, P. (2001). Características socioeconómicas y alimentarias en hogares de niños y madres cuidadoras de guarderías de una zona de bajos recursos en Caracas Venezuela. In: *INCI* Vol.22, No.12, 23/08/2011, Available from: <http://www.scielo.org.ve/scielo.php?pid=S0378...script=sci>
- Buzzard, M. (1998). 24-hour dietary recall and food record methods. In: *Nutritional epidemiology*, W. Willet (Ed.), pp. 50 -73, Oxford University Press, ISBN 0-19-512217-6, Oxford
- Carmona-Fonseca, J.; Correa, A. & Alcaraz, G. (2005). Población, alimentación y estado nutricional entre los tules (kunas) del resguardo Caimán Nuevo (Turbo y Necoclí;



- Antioquia, Colombia), 2003-2004. *IATREIA*, Vol.18, No.3, pp. 258 - 278, ISSN 0121-0793
- CONPES (2008). Consejo Nacional de Política Económica Social. República de Colombia, Departamento Nacional de Planeación. In: *Documento CONPES Social 113*, 23/08/2011, Available from: <http://www.minproteccionsocial.gov.co>
- Contreras, J. & Gracia, M. (2005). *Alimentación y cultura. Perspectivas antropológicas*, Ariel editores, ISBN 84-344-2223-9, Barcelona
- Correa, F. (Comp.) (1988) *Atención integral a la familia indígena*. Documento Marco. Instituto Colombiano de Bienestar Familiar, Unpublished document, Bogotá
- Crenn, C.; Delavigne, A.E. & Téhoueyres, I. (2010). Migrants' food habits when returning home (in Bamako, Mali, and Dakar, Senegal). In: *Anthropology of food*, 16.06.2011, Available from: <http://aof.revues.org/index6629.html>
- de Garine, I. & Harrison, G.A. (Eds.) (1988). *Coping with uncertainty in food supply*, Clarendon, ISBN 978-189-9825-35-6, Oxford
- de Garine, I. (1980). Une anthropologie alimentaire des français? *Ethnologie Française*, Vol.X, No.3, pp. 227-238
- de Garine, I. (1988). Antropología de la alimentación y pluridisciplinariedad. *América Indígena*, Vol.XLVII, No.3
- de Suremain, C.E. & Katz, E. (2009). Introducción: Modelos alimentarios y recomposiciones sociales en América Latina. *Anthropology of food*, 16.06.2011, Available from: <http://aof.revues.org/index6432.html>
- Duque, M.; Espinosa, I.; Gálvez, A.; Herrera, D. & Turbay, S. (1997). *Chajeradó, el río de la caña flecha partida: impacto sociocultural de la explotación de madera sobre un grupo embera del Atrato medio antioqueño, Colombia*, Ed. Concultura, ISBN 958-6122-80-8, Bogotá
- Emerson, R.; Fretz, R. & Shaw, L. (1995). *Writing ethnographic fieldnotes*, The University of Chicago Press, Chicago, USA
- FAO (2002). *Latin foods*, 15.03.2004, Available from: <http://www.rlc.fao.org/bases/alimento/default.htm>
- FAO (2006). *Cumbre Mundial sobre la Alimentación, 1996. Informe de políticas*. Junio, No.2, 2.12.2007, Available from: [http://www.fao.org/index\\_es.htm](http://www.fao.org/index_es.htm)
- Fischler, C. (1995) *El (h)omnívoro. El gusto, la cocina y el cuerpo*, Editorial Anagrama, ISBN 978-84-339-1398-2, Barcelona, Spain
- Food and Nutrition Board (2004). *USDA. Hand Book 8*, 10.02.2004, Available from: <http://www.hoptechno.com/nightcrew/sante4me/usda19datashape.cfm>
- Gálvez, A. (1993). *La herencia del pájaro cuéndola: la alimentación de los indígenas eyabida del noroeste antioqueño*. Mémoire de maîtrise, Departement D'Anthropologie, Faculté des Arts et des Sciences, Université de Montréal
- Gálvez, A.; Alcaraz, G.; Arias, M.M.; Gutiérrez, S.Y. & López, A.D. (2002). *El mañana que ya entró: La fecundidad en los pueblos indígenas de Antioquia*. Editorial Universidad de Antioquia, ISBN 958-655-544-5, Medellín, Colombia
- García, C. (2002). El vegetarianismo. ¿Dieta prudente o estilo de vida? In: *Somos lo que comemos: estudios de alimentación y cultura en España*, M. Gracia (Ed.), pp. 249-276, Editorial Ariel, ISBN 978-84-344-2218-6, Barcelona

- Goloubinoff, M. (1996). Coca et sauterelles grillées. Les aliments modernes face aux saveurs du terroir dans une campagne mexicaine. In: M.C. Bataille-Benguigui & F. Cousin (Eds.), *Cuisines. Reflets des sociétés*. Sépia-Musée de l'Homme, pp. 199-215, Paris
- Huamán, L. & Valladares, C. (2006). Estado nutricional y características del consumo alimentario de la población aguaruna. Amazonas, Perú 2004. *Rev Peru Med Exp Salud Pública*, Vol.23, No.1, pp. 12-21, ISSN 1726-4634
- ICBF (1988). *Tabla de composición de alimentos colombianos*. Talleres de sesión de Publicaciones. Instituto Colombiano de Bienestar Familiar, Bogotá
- ICBF (2006). Ingesta Dietética. Encuesta nacional de la situación nutricional en Colombia, 2005., pp. 229-261, Instituto Colombiano de Bienestar Familiar, ISBN 978-958-623-087-2, Bogotá
- Kaberry, P. M. (1957). Myth and ritual: some recent theories. *Bulletin of the Institute of Classical Studies*, Vol.4, pp. 42-54, ISSN 2041-5370
- Kuhnlein, H. V. (2007). Indigenous Peoples' Food Diversity and Food Security. *FASEB Journal*, Vol.21, No.5, pp. A672-A673, ISSN 0892-6638.
- Lareo, L.; Gracia, B.; Fajardo, L.; Romero-Acciarri, L.H.; Pradilla, G.; Maldonado, A.; Redd, C. & Daza, C. (1990). From food basket to food security the food factor nutritional surveillance. *Archivos Latinoamericanos de Nutrición*, Vol.XL, pp. 22-29, ISSN 0004-0622
- Le Breton, D. (2004). *Antropología del cuerpo y modernidad*, Nueva Visión, ISBN 950-6023-33-6, Argentina
- López, J. (2003) Algunas consideraciones metodológicas en los trabajos de campo en antropología de la alimentación. Experiencia con mayas ch'orti' del oriente de Guatemala. *Revista de Antropología Social*, Vol.12, pp. 223-241, ISSN 1131-558X
- Lorenzana, P. & Sanjur D. (2000). La adaptación y validación de una escala de seguridad alimentaria en una comunidad de Caracas, Venezuela. *Archivos Latinoamericanos de Nutrición*, Vol.50, No.4, pp. 334-340, ISSN 0004-0622
- Manjarrés, L.M. & Correa, J. (2006). *Programa de Evaluación de Ingesta Dietética. Software*. Escuela de Nutrición y Dietética. Universidad de Antioquia, Medellín, Colombia.
- Messer, E. (1995). Un estado de la cuestión: Perspectivas antropológicas sobre la dieta. In: *Alimentación y Cultura*, J. Contreras (comp.), Editorial Universitat de Barcelona, ISBN 84-475-1103-0, Barcelona
- Mintz, S.W. & Du Bois, C.M. (2002). Anthropology of food and Eating. *Annual Review of Anthropology*, Vol.31, pp. 99-119, ISSN 0084-6570
- Muchnik, J. (2004). Identidad territorial de los alimentos: alimentar el cuerpo humano y el cuerpo social. In: *Territorios y sistemas agroalimentarios locales*, A. Machado & M. Pinzón (Eds.), pp. 17-32, Universidad Nacional de Colombia, ISBN 958-701-415-4, Bogotá, Colombia
- Murcott, A. (1988). Sociological and Social Anthropologic approaches to food and eating. In: *World Review of Nutrition and Dietetics*, Vol.55, G.H. Bourne (Ed.), pp. 1-40, Karger, ISBN 3-8055-4703-X, Basel
- Nusser, S.M.; Carriquiry, A.L.; Dodd, K.W. & Fuller, W.A. (1996). A Semiparametric Transformation Approach to Estimating Usual Daily Intake Distributions. *Journal*

- of the American Statistical Association, Vol.91, No.436, pp. 1440-1449, ISSN 0162-1459
- Olsen, W. (2004). Triangulation in social research: Qualitative and Quantitative methods can really be mixed. In: *Developments in Sociology*, M. Holborn (Ed.), Causeway Press, ISBN 978-1-902796-82-6, Ormskirk, Lancashire
- Pineda, R. & Gutiérrez de Pineda, V. (1999). Criaturas de Caragabí. Indios choques: Emberaes, Catis, Chamíes y Noanamaes. Editorial Universidad de Antioquia, Departamento de Publicaciones, ISBN 958-655-33-33, Medellín, Colombia
- PNUD (2011). *Colombia rural. Razones para la esperanza. Informe Nacional de Desarrollo Humano 2011*. Indh, Programa de las Naciones Unidas para el Desarrollo, Pnud, septiembre, ISBN 978-958-8447-63-6, Bogotá
- Programa Mundial de Alimentos de las Naciones Unidas. (2006). Diagnóstico de la Seguridad Alimentaria y Nutricional en el Chaco Boliviano. In: *Focalización, Monitoreo y Evaluación*, October Series, 23.08.2011, Available from: <http://www.pma.org.bo>
- Restrepo, B.N.; Restrepo, M.T., Beltrán, J.C.; Rodríguez, M. & Ramírez, R.E. (2006). Estado nutricional de niños y niñas indígenas de hasta seis años de edad en el resguardo embera-katio de Tierralta (Córdoba). *Biomédica*, Vol.26, No.4, ISSN 0120-4157
- Restrepo, E. (Ed.) (1996). *Renacientes del Guandal. "Grupos negros" de los ríos Satinga y Sanquianga*. Proyecto Biopacífico, Universidad Nacional de Colombia, ISBN 978-958-9593-61-5, Bogotá, Colombia
- Restrepo, M.T.; Quintero, D.; Martínez, M.M.; & Gómez, A.M. (2006). *Técnicas para la toma de medidas antropométricas*. Centro de Atención Nutricional, ISBN 978-958-44-0038-3, Medellín, Colombia
- Reyes, I.; Nazar, A.; Estrada, E. & Mundo, V. (2007). Alimentación y suficiencia energética en indígenas migrantes de los Altos de Chiapas, México. *Archivos Latinoamericanos de Nutrición*, Vol.57, No.2, ISSN 0004-0622
- Rosique, J. (2010). *Field diary 2010 may-jun. Estudio antropométrico de comunidades indígenas del Área de influencia de Cerrejón*, Personal manuscript, Medellín.
- Rosique, J.; Álvarez, M.C.; Restrepo, M.T.; Pérez, F.C.; Rebato, E., Susanne, C. (2004). *Seguridad Alimentaria y Nutricional en el municipio de Acandí*. Universidad de Antioquia, CODI, Unpublished research report, Medellín, Colombia
- Rosique, J.; Restrepo, M.T.; Manjarrés, L.M.; Gálvez, A. & Santa, J. (2010). Estado nutricional y hábitos alimentarios en indígenas embera de Colombia. *Revista Chilena de Nutrición*, Vol.37, No.3, pp. 270-280, ISSN 0717-7518.
- Scheper-Hughes, N. (2001). *La muerte sin llanto. Violencia y vida cotidiana en Brasil*. Editorial Ariel S.A., ISBN 978-84-344-7463-5, Barcelona
- Sociedad Latinoamericana de Nutrición. (1997). *Promoviendo la seguridad alimentaria y nutricional en América Latina*. Proceedings of the XI Congreso de la Sociedad Latinoamericana de Nutrición, INCAP and SLAN, Guatemala
- Vizcarra, I. (2002). *Entre el taco mazahua y el mundo. La comida de las relaciones de poder*. Universidad Autónoma del Estado de México, ISBN 968-835-755-3, México



## **An Ethnography of Global Landscapes and Corridors**

Edited by Dr. Loshini Naidoo

ISBN 978-953-51-0254-0

Hard cover, 270 pages

**Publisher** InTech

**Published online** 09, March, 2012

**Published in print edition** March, 2012

The chapters presented in this book draw on ethnography as a methodology in a variety of disciplines, including education, management, design, marketing, ecology and scientific contexts, illustrating the value of a qualitative approach to research design. The chapters discuss the use of traditional ethnographic methods, such as immersion, observation and interview, as well as innovative ethnographical methods which have been influenced by the new digital culture. The latter challenges notions of identity, field and traditional culture such that people are able to represent themselves in the research process rather than be represented. New approaches to ethnography also examine the use and implication of images in representation as well as critically examining the role and impact of the researcher in the process.

### **How to reference**

In order to correctly reference this scholarly work, feel free to copy and paste the following:

Javier Rosique, Aída Gálvez, María Teresa Restrepo, Luz Mariela Manjarrés and Erika Valencia (2012). Food and Nutrition in Embera Indigenous People, An Ethnography of Global Landscapes and Corridors, Dr. Loshini Naidoo (Ed.), ISBN: 978-953-51-0254-0, InTech, Available from: <http://www.intechopen.com/books/an-ethnography-of-global-landscapes-and-corridors/food-and-nutrition-in-embera-indigenous-people>

**INTECH**  
open science | open minds

### **InTech Europe**

University Campus STeP Ri  
Slavka Krautzeka 83/A  
51000 Rijeka, Croatia  
Phone: +385 (51) 770 447  
Fax: +385 (51) 686 166  
[www.intechopen.com](http://www.intechopen.com)

### **InTech China**

Unit 405, Office Block, Hotel Equatorial Shanghai  
No.65, Yan An Road (West), Shanghai, 200040, China  
中国上海市延安西路65号上海国际贵都大饭店办公楼405单元  
Phone: +86-21-62489820  
Fax: +86-21-62489821

© 2012 The Author(s). Licensee IntechOpen. This is an open access article distributed under the terms of the [Creative Commons Attribution 3.0 License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

IntechOpen

IntechOpen