



Native Foods

From Peru to the world



Native Foods

From Peru to the world



Native foods from Peru to the world

© Teresa Blanco de Alvarado-Ortiz

First Edition, October 2016

© Of this edition
Universidad San Ignacio de Loyola
Fondo Editorial
Av. La Fontana 550, La Molina, Lima.
www.usil.edu.pe

Project Director

Luciana de la Fuente de Diez Canseco

Editorial Supervision

Fondo Editorial USIL

Design and layout

Brincala – Laboratorio Grafico

Photography

Vanessa Colareta Champin / Proyecto Especial Zona Arqueologica de Caral / USIL
Shutterstock: p. 28 Mikadun, p.31 Ostill, p.48 Christian Vincas, p.68 Ostill, p. 112 Oliver Foerstner

English Translation:

Christopher J. Palasz

Legal deposit made at the Biblioteca Nacional del Peru under N° 2016-13776
Hecho el Depósito Legal en la Biblioteca Nacional del Perú N° 2016-13776

ISBN: 978-612-4119-804

October 2016

Printer:

Editorial Super Gráfica E.I.R.L.
Av. Naciones Unidas N° 1830. Lima 01

Print run:

500 ejemplares

The total or partial reproduction of the graphic designs of this book are strictly prohibited. No text or image content of this edition may be reproduced, copied or transferred through any printed, digital or electronic means, without the express permission in writing from the editors.

Any illegal act committed against the intellectual property rights related to this publication shall result in the filing of a complaint as provided under Legal Decree 822 - Copyright act in Peruvian Legislation in addition to existing international standards and regulations.

To the Andean farmers, heirs to
the ancestral culture that keeps our ecological
diversity alive for the benefit of humanity

Foreword



Peru ranks among the top 10 most megadiverse countries in the world, because it possesses 11 natural ecoregions, 84 natural life zones and approximately 25,000 species, close to 10% of the total vast population of plant biodiversity on Earth. This characteristic is perhaps its leading comparative advantage for economic and social development.

Quinoa is one product that emerged from this cradle of biodiversity, “the sacred pearl-like grain” believed by Pre Hispanic cultures to be the food of the gods for its high content of nutrients. These lands also gave birth to the potato, “the treasure of the Andes” , which expanded throughout the world with the arrival of the Spaniards in the 16th century, saved Europe from starvation and was the first vegetable that NASA grew in outer space.

Our vast food biodiversity is well-known for its contribution to regional and global

food baskets. In addition, Peru is one of the points of origin of plant and animal genetic resources, ranking first for its number of domesticated native species (128). It also possesses great genetic diversity in potato and corn crops (two out of the four most important crops of global human food). All of this has been maintained over time because of the wisdom and hard work of rural farmers, who using ancient technologies, such as Andean platform terrace farming and irrigation methods, have helped certain species of crops to survive over time, which today have amazed people all over the world.

However, our country also is the bearer of dramatic figures of a different nature: a high rate of chronic child malnutrition that continues to persist despite economic growth and the implementation of food safety programs carried out in recent years in many of the poorest rural

regions (Cajamarca, Huánuco, Cuzco and Huancavelica). It is a paradox of our country that while the preservation of this vast biodiversity we are so proud of rests directly upon the shoulders of the small farmers who inhabit these regions, that it is the children of these very families who are the most undernourished. Poverty and malnutrition represent dual circumstances exacerbated by exclusion and inequality. For this reason, malnutrition is more than an indicator of health. It is an indicator of a country's development.

In Peru, two coexisting factors make it possible to overcome this critical situation: the global recognition of our cuisine and growing interest in healthy eating which assumes a balanced diet of quality whole foods. The country has an extensive assortment of native products available in its grains, fruits and vegetables that represent a solid foundation of healthy eating and would benefit from assessment within the value chain of nutrition and cuisine.

Andean agriculture sustained the development of Pre-Hispanic cultures and remains the primary food supply source of cities in constant growth. We need an efficient national native organic food production and distribution system that make these activities more competitive for the benefit of the population who earn a living from farming and biodiversity. Beyond the economic and commercial benefits, rural farm settlements not only provide a supply of a variety of food ingredients, they acquire social and cultural relevance for our farmers, which makes it possible for them to sustain the livelihood of their communities.

In this regard, science has gone straight to the point in the debate on biodiversity and genetically modified food. Over 100 Nobel Prize winners in the fields of Medicine, Chemistry, Physics and

Economics have recently stated that there are no cases to date that show that the consumption of transgenic food is harmful to human health. If this proposal flourishes, the entrance of transgenic seeds into the market could potentially endanger the biological diversity of a wide variety of genetics, one of our greatest heritages and the foundation of the emergent agricultural and veterinary value chain linked to gastronomy.

Here is the importance of national agricultural scientific research to identify existing endemic species and using modern technology, enhance the seeds without the need to resort to adding transgenes. In Peru, this debate is crucial because Peru is one of the few economies in South America that possesses transgenic free agriculture, thanks to an existing ban on such substances, which expires in the year 2021. Eventually genetically modified crops will spread throughout the world and our country must be prepared to make a decision.

Hence the significance of this publication which includes research work conducted by Dr. Teresa Blanco. This work joins two concepts: nutrition and gastronomy, synonyms of balance and well-being, and it argues that only research, innovation and technology will be successful at enhancing the nutritional value of these native food species, improving the competitiveness of the gastronomical value chain and protecting the environment and biodiversity.

Raúl Díez Canseco Terry

Founding President
Universidad San Ignacio de Loyola

Prologue

Since ancient times, food and nutrition have been at the core of the life of our nations and communities. Perhaps of all the earthly pleasures in existence, the one that always endures from the time of our ancestral cultures is the joy of eating, and eating healthily.

The Andean diet is a model characterized by a combination of different foods that are derived primarily from agriculture, a heritage of a thousand year old interaction between man and its food, environment and the regular physical activity of workdays in the field. Historical evidence has proven the beneficial effects of an indigenous diet on health.

However, during recent decades, our country has undergone some profound economic and socio cultural changes that have had a direct impact on eating patterns that jeopardize our health, particularly that of children and young people. The growing increase of advertising and the availability of highly processed foods of low nutritional value are causing chronic ailments related to



excessive or poorly balanced eating habits.

On the other hand, thousands of people coexist, particularly children who do not receive sufficient essential nutrients to live a healthy life, which leads to deficiencies in their physical and mental development as well as dreadful illnesses and death.

As demonstrated by science, it is not necessary to have access to a sufficient quantity of food to be well nourished, but rather that the food be of good quality. The population must be aware of what constitutes a healthy diet and how to make appropriate food choices. Gastronomy and the talent of knowing how to eat well requires something else: being knowledgeable about their consequences for our health. We must learn the biochemical and physiological processes that occur in our body to assimilate food components or transform them into energy. This means to get an education on nutrition.

The significant advances achieved in recent times by Peruvian gastronomy and its great potential bear the challenge of integrating flavor with health and sustainability, because people of today seek healthy and natural foods for their well-being. There is increasing interest on the part of people to adopt a healthy lifestyle with a balanced diet, regular physical exercise, organizing their daily lives and mental harmony as the core principles of perfect health.

For this reason the United Nations Food and Agriculture Organization (FAO) recognizes nutritional education as a formidable strategy to improve food security programs in the world. It becomes increasingly necessary to implement educational campaigns that empower citizens to feed themselves properly, including nutritious, fresh, locally produced foods.

As a contribution to nutritional education in Peru and through this publication, Universidad San Ignacio de Loyola seeks to promote a lifestyle of healthy,

nutritious and delicious eating, based on traditionally outstanding native agricultural products from different regions of the country. The promotion of appropriate nutritional diets for all Peruvians should be the primary goal of the National Government over the coming years, aiming to improve the health and well-being of the entire population and foster social and economic development.

Luciana de la Fuente de Diez Canseco

Chief Executive Officer
Universidad San Ignacio de Loyola

Introduction

I am writing my 12th book in my aim to contribute to Universidad San Ignacio de Loyola's commitment to cast a spotlight on the importance of Peru's indigenous foods, popular for their nutrition and health properties, flavor, aroma, different colors and rich phytochemical content, the foundation of a cuisine that is highly valued today across the globe. Also worth recognizing is the fact that, in our country, vegetable production is a determinant of our national heritage.

This book has two parts. The first part is devoted to the Peruvian people and their ancient relationship with the Andes, highlighting the wisdom of local farmers in the domestication of native plants and in environmental conservation. We also take a close look at the biodiversity of vegetables and their nutrients (water, carbohydrates, fats, proteins, enzymes, minerals and vitamins). The



book concludes with the analysis of 69 products classified into the food groups of grains and fruits. The second part, written by chefs Carolina Guzman and Nicolas Huertas, explains the relationship between gastronomy and nutrition and contains a select cuisine that makes use of the vegetables discussed in the book as serves to satisfy the need to learn more about and share these highly nutritious and healthy native culinary treasures, many of which are still unknown.

I wish to express my sincere gratitude and appreciation to María Alejandra Meza and Jessica Torres, for their invaluable contributions to the writing of this book.

Teresa Blanco de Alvarado-Ortiz

Table of Contents

Foreword
Prologue
Introduction

Part One

Chapter I: Man and the Andes

1. Peru's first inhabitants	21
2. Emergence of the horticulturalists	22
3. Sedentary farmers	23
4. The first Andean civilization	24
5. Coexisting with nature	26
6. The agricultural calendar	27
7. Fertilization from mother earth	29
8. Women and the preservation of agricultural life	30
9. Terraces	33
10. The water of life	35
11. Students of the Andes	36

Chapter II: Nutritional wealth of Peru's native vegetable crops

1. Biodiversity of Peru's vegetable crops	49
2. Nutrients in native vegetables	54
Macronutrients	57
Water	
Carbohydrates	
Fats	
Proteins	
Enzymes	62
Micronutrients	63
Minerals	
Vitamins	
Phytochemicals	64
Colorants	
3. Toxic substances in food	65

Chapter III: Peru's native vegetables

1. Leafy vegetables	69
Green leafy vegetables	69
Ataño (Chinese spinach)	Llampun cjana or Cjana cjana
Chijchipa	Pijuayo (Peach palm fruit)
Cochayuyo	Yuyo (Seaweed)
Aromatic leafy vegetables or spices	73
Huacatay (Black mint)	
Muña (Muna)	
Paico	
Fruits that are consumed as vegetables	75
Aji Peppers	Rocoto
Caigua	Tomato
Avocado	Squash
Sweet Peppers	Pumpkin squash
Ground Vegetables	83
Root vegetables	84
Achira	Maca
Ahipa	Mauka
Arracacha (Peruvian parsnip)	Yacón
Sweet potato	Cassava or mandioca
Tubers	92
Mashua	Olluco
Oca	Potato, amka
2. Andean grains	98
Chenopodioideae	98
Cañihua, kañiwa	
Quinoa	
Amarantus	100
Kwacha	
Cereal	101
Corn	
Pulse	104
Bean	Lima bean
Peanut	Tarwi
Pajuro bean	

Chapter IV: Andean and amazon fruit

1. Andean fruit	113
Capulí (Andean Black Cherry)	
Cherimoya (Custard Apple)	
Lúcuma	
Andean Blackberry	
Pacay	
Papaya	
Sweet Pepino	
Pushgay (Andean blueberry)	
Sachatomate (Tree tomato)	
Elderberry	
Aguaymanto (Cape gooseberry)	
Tumbo	
2. Amazon tropical forest fruit	125
Aguaje	
Almond (Piqui)	
Anona (Wild sweetsop)	
Arazá	
Caimito (Abiu)	
Camu-camu	
Brazil nut	
Amazon tomato or cocona	
Chambira palm fruit	
Granadilla de Olor (Bell Apple)	
Guanabana (Soursop)	
Guarana	
Huito	
Mamey apple	
Marañón (Cashew)	
Naranjilla/ Lulo	
Pijuayo	
Ungurahui (Patawa fruit)	
Zapote	

In conclusion 144

Part II

Estimated energy requirements for moderately active healthy individuals	152
Estimated protein requirements for moderately active healthy individuals	153

Recipes that use native Peruvian vegetables

Starter dishes

Pumpkin - Paico Quiche	158
Lentil and Maca soup	160
White corn pie	162
Arracacha croquette	164
Yacon salad	166
Shrimp and camu-camu ceviche	168

Main dishes

Peruvian pumpkin stew	172
Quinoa chowder	174
Black quinoa stew	176
Caigua shrimp stew	178
Fresh lima bean soup	180
Rabbit and peanut sauce	182
Potato mash with Cecina (Peruvian cured meat)	184
Cassava mash	186
White corn Pepian with coriander	188

Desserts

Cheesecake with amazon flavors	192
Cassava chocolate truffles with lucuma foam and cocona sorbet.	194
Lulo crepes with cherimoya sorbet	196
Amazon style picarones	198
Almond, camu-camu and white chocolate tartlets	200
Giant tumbo soufflé glacé with Pacay Tartare	202
Chocolate tart with Papayita	204
Hot chocolate soufflé with black berry jam	206
Native plum tart	208
Melon pear sorbet	210

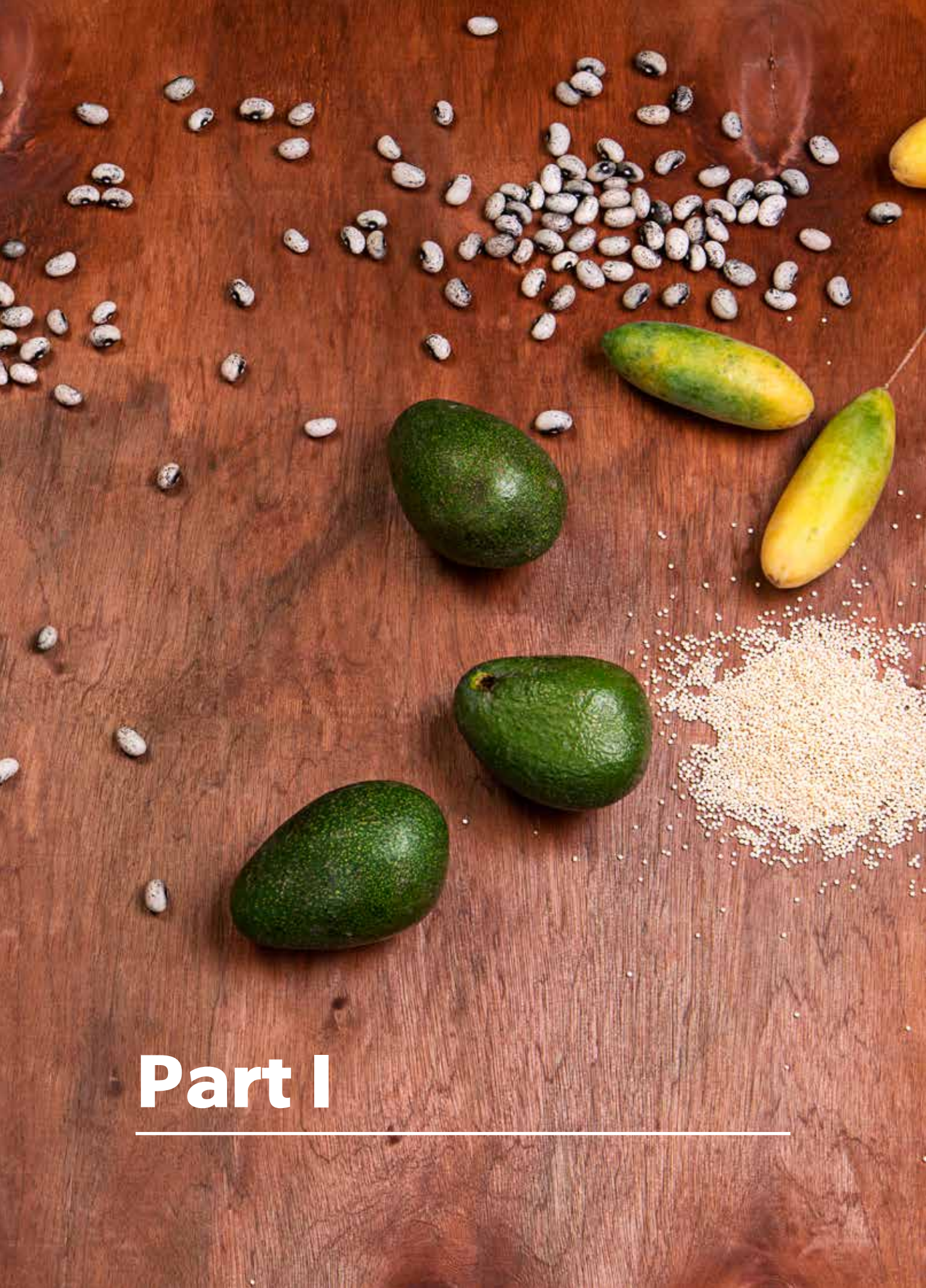
Appendices

Protein content of selected recipes	214
-------------------------------------	-----

Bibliography

240





Part I

Chapter I

Man and the Andes



1 Perú's first inhabitants

In his book *"Historia y Arte del Peru Antiguo"* (2002), Federico Kauffmann Doig writes that the oldest traces of man found in Peru will allow us to confirm what he did long ago between the years 12,000 and 14,000 B.C. When these first explorers arrived, they found different ecosystems and multiple climates in an extensive territory with desert coasts without vegetation of any kind, intersected by fertile valleys irrigated by rivers that flowed down from the Andean Mountain range. They crossed the highland plateaus and ravines until reaching the great Amazon Rainforest.

Their nomadic way of life led them to feed on wild vegetables, stems, flowers, fruits and roots from the abundant plant life that surrounded them. They also were able to consume meat from animals they hunted, with sticks and stones. Some of these animals were mammoths, mastodons, saber-tooth tigers, paleo-llamas (predecessors of llamas, vicuñas and guanacos), deer, rodents and rheas.

Studies conducted by Cardich, Matos and Ravines published in *Perú Antiguo* (1982) confirm this way of life, evidenced by the archeological remains described below:

Lauricocha Man, found in a cave located in the Andes at the source of the Marañon River (Huánuco), discovered by Augusto Cardich, who estimated its age at 9,525 years old. According to his discoverer, the Lauricocha Man was a gatherer who knew about fire, and used stone instruments.

Piquimachay Man discovered in Ayacucho in 1969 by United States archeologist Richard MacNeish, who dated the find at 20,000 years old. This man was a hunter - gatherer. The cave contained remains of stone knives.

Toquepala Man, found in Tacna in 1961 by Emilio Gonzales. Here they found the first cave paintings in Peru. Toquepala Man was a hunter gatherer. He also made use of fire. This find dates back 9,580 years.

Chivateros Man was discovered in 1962, near the mouth of the Chillón River, in Lima by archeologist Edward Lanning, who estimated it to be 12,000 years old. This man was a gatherer, who had knowledge of how to sculpt tools from stone and had the oldest Paleolithic workshop in Peru. He used stone instruments to help him gather food. The hillsides of the Chivateros Mountain are covered with quarries containing metavolcanic and metabolite stones that were used to make tools and artefacts.

2 Emergence of the horticulturalists

The population of gatherers become sedentary when they learn to grow the most primitive species of potatoes and ollucos as shown in *Tres Ventanas and In Kiqche*. That transition in lifestyles, from nomads to horticulturalists, occurred simultaneously between 7,000 and 5,000 B.C., in Southeast Asia, the Near East and in Mesopotamia. Kauffmann Doig (2002) records the following archeological discoveries:

Paracas Man. His remains were found by Swiss archeologist Frederic Engel, who states that this inhabitant lived about 8,000 years B.C. in the pampas of Santo Domingo de Paracas, and was “one of the oldest horticulturalist settlers of Peru”. The Paracas culture was discovered in 1925 by Peruvian archeologist Julio César Tello. South of Pisco, in Cerro Colorado, on the Paracas peninsula, he found 429 funerary bundles containing the remains of important mummified people, wrapped in fine cloaks and surrounded by ceramic pieces, hunting artefacts, animal skins and food.

Guitarrero Man. Lived around the period of 7,000 years B.C., as estimated and corrected by its discoverer USA archeologist Thomas Lynch, who initially had placed its age at around 9,000 years B.C., assigning greater age to the context of Andean Agriculture and South America. This man settled in the *Callejon de Huaylas*, in the Santa River Basin, facing Huascaran snow-capped mountain peak, in the department of Ancash.

Nanchoc Man. In his book, *Orígenes humanos en los Andes*, Elmo León Canales (2007) states that Man of Nanchoc is among the first farmers, based on data gathered since 1977 in the Alta Zana Valley - about 500 m.a.s.l. in the province of San Miguel (Cajamarca), by USA archeologist Tom Dillehay, of Vanderbilt University.

At Nanchoc, Dillehay found the remains of a pumpkin squash (a small pumpkin) dating back to 7,290 years B.C., next to remnants of peanuts (5,890 B.C.), quinoa (6,050 B.C.) and cotton fibers, arguing that the Nanchoc Man was the first horticulturist identified in the Peruvian Andes

Dillehay's findings supplement the research done by Dolores Piperno of the Smithsonian Institute of Tropical Research, who in Nanchoc found 39 teeth from six or eight men dating back to 7,050 years B.C. The teeth had plaque containing starch residues, which indicated that they grew squash or pumpkins, beans, peanuts and pacay fruit trees, giving credence to the hypothesis that they were farmers and cooked their own food. (León, 2004).

3 Sedentary farmers

In his book entitled *Alimentación y obtención de Alimentos en el Perú prehispanico*, Hans Horkheimer (2004) tells us that agriculture began around 6,000 to 8,000 years ago with the selection of wild plants and their domestication. Another author, León (2004) states that toward 4,000 B.C., the nomads began the transition to sedentary farming when they began working the land. He says that the first farmers planted corn, avocado, peanuts, cassava, guava, aji, squash, lucuma, cotton, quinoa, cherimoya, canavalia, jiquima, lima beans, beans, sweet potatoes, olluco, oca and potatoes. In coastal regions, plants were cultivated in valleys and on riverbanks, while the communities who lived closer to the sea could also enjoy fish and seafood. Ever since, Peru has been recognized the world over for its vast biological diversity, its complex ecology and diverse geography in proximity to the equator, which constantly endures from the ravages of El Nino phenomenon and which is simultaneously and completely bisected by the Andean Mountain range. The oldest remaining signs of this era includes:

Kotosh Man was discovered in Huánuco by a Japanese expedition led by Seichi Izumi. There they found the oldest religious structure in the region: The Temple of the Crossed Hands, dating back 4,000 - 4,200 years B.C. They also found human remains of farmers who cultivated the land with great skill.

Huaca Prieta Man. According to its discoverer, USA archeologist Junius Bouton Bird, this man lived in Peru around 4,000 years B.C. in the area of Chicama, in the current Department of La Libertad. This community created handmade squash gourds and they planted a variety of edible crops and cotton.

Lurín Man. Was discovered by Josefina Ramos, an anthropologist graduated from *Pontificia Universidad Católica del Perú*, who estimated the age of these remains at about 2,200 years B.C. He lived exactly 23 kilometers from Lima. He used stone slates bonded with clay to build housing and he used instruments to grow different vegetables.

4 The first Andean civilization

Ruth Shady Solís, anthropologist and Director of the Caral-Supe/INC Special Archeological Project (PEACS) tells us in her book *La Ciudad Sagrada de Caral-Supe: Símbolo cultural del Perú*, about this cultural Peruvian symbol of Peru located in the Supe Valley north of Lima and dating back to around the year 5,000 B.C. From this area, Caral emerges as the true dawn of a civilization whose inhabitants transformed their environmental surroundings with creativity and a great deal of ingenuity and adapted to every situation they encountered. (Shady, 2006).

Archeologists Julio César Tello and Max Uhle knew since the beginning of the 20th century that there were monumental structures in the Supe Valley but it was Shady who set up excavation sites there in 1996 and confirmed the pre-ceramic nature of the Sacred City of Caral as the first Andean civilization that was initially received with skepticism by archeologists. However, as research progressed, and new publications appeared along with continuous carbon 14 testing, the date or origin, the authenticity and nature of this civilization was finally confirmed.

“With this vision they transformed the two principle resources into deities: The Pachamama and the Cochamama, must be respected and treated properly if the people want a bountiful harvest”

Ruth Shady - *Patrimonio cultural y desarrollo social*

Caral is considered the earliest civilization of the Andes and South America. Its inhabitants had a balanced diet consuming vegetables such as sweet potatoes, lima beans, guava, squash and achira, combined with seafood products such as fish, mollusks and crustaceans. There they constructed pyramid shaped buildings and humans held meetings in their town squares to discuss economic, social and religious matters. This happened while the Egyptians were building their mastaba tombs and/or the first step pyramid at Sakkara, and later on, the pyramids at Cheops, Chephren and Mykarinos in the Giza Valley. Moreover, the Sumerian cities of Mesopotamia and the markets of India were also under construction between 3,000 and 2,500 B.C.

