Journal of Natural and Allied Sciences
Vol. II No.I, pp. 49-56, December 2018

CACAO AND TABLEA TSOKOLATE: SPANISH CONTRIBUTION IN PANGASINAN AGROFORESTRY, CULINARY, AND ECONOMY

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Abstract *- Cacao (Theobroma cacao) is a tropical, plant of the family Sterculiaceae. It has many uses and by-products from husk, shell, pulp, and beans. Its beans are known to have the highest antioxidant value of all natural foods in the world. In areas in the Philippines including Pangasinan where cacao is grown, it is not uncommon to see tablea tsokolate a home-made chocolate from the beans of cacao. In Pangasinan, tablea tsokolate is usually partnered with the native puto of Calasiao, or suman and mango for breakfast or snacks. Because of the plant's growth habit and characteristics, cacao is one among the agroforest species being promoted by the Department of Environment and Natural Resources to maximize land productivity, enhance ecological stability, and improve socio-economic condition of the farmers.*

This paper traces the Spanish contribution of cacao and tablea tsokolate in Pangasinan that has impacted the agroforestry, culinary, and economy of the province.

Keywords *- cacao, tablea tsokolate, agroforestry, culinary, economy*

INTRODUCTION

In 16th century, Spain was known for conquering lands in search for spice island, to acquire a share in the spice trade, develop contacts with China and Japan, and gain converts to Christianity. Only the last objective was realized and so they settled and established communities from 1565 to 1898 (for 333 years) in the Philippines.

The conquest of the province Pangasinan began in 1571 with the expedition of conquistador Martin de Goiti. Juan de Salcedo followed a year later by sailing through Lingayen Gulf and landed at the mouth of Agno River. The army led by Juan Salcedo was responsible in chasing out Limahong, a Chinese pirate, after a seven-month siege in 1574. Pangasinan was made into an 'Alcadia Mayor" and in 1611, became a Spanish colonial province with Lingayen as the capital.

Today, Spanish influences are very much evident specifically in the agroforestry, culinary and economy of Pangasinan.

OBJECTIVES OF THE STUDY

Generally, this study traced the Spanish contribution to the introduction and development of cacao and tablea tsokolate that impacted the Pangasinan agroforestry, culinary and economy.

Specifically, it aimed to determine:

1. The point of origin, distribution, introduction and spread of cacao plant in Philippine soil;
2. the cultivation of cacao as an agroforest species, harvesting and post-harvest of cacao during Spanish time;
3. the profile of cacao, its uses, chemical content, and value or benefits;
4. The development of homemade tablea tsokolate;

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5. Cacao and tsokolate's contribution to the local economy; and
6. Recommend strategies and guidelines for the promotion of cacao and tablea tsokolate to preserve the Spanish legacy in the province

Significance of the Study

Results of this study will be particularly useful to the cacao farmers, agroforesters, environmentalist, entrepreneurs, local leaders, researchers, the Department of Agriculture and the Department of Environment and Natural Resources.

This study will provide information that will further the people's appreciation of cacao and its tablea tsokolate specifically their contribution to the province's agroforesty, culinary and economy.

MATERIALS AND METHODS

A combination of historical, and explanatory research design were employed. Documentation was the main technique in gathering secondary and primary data consisting of written, visual, audiovisual and digital documents. Observation, and one-one interview with entities concerned were also employed for a qualitative and quantitative study.

The study was conducted in identified small scale cacao plantation and homemade tablea tsokolate industry in Aguilar, Pangasinan.

RESULTS AND DISCUSSION

For many millennia, cacao originated in the understory of the tropical rainforest of northern Amazon basin. The people who first utilized cacao were the inhabitants of Venezuela in northwestern South America, where the tree is native. The Olmec Civilization (3500 to 2500 years ago) consumed the beverage and used to fortify soldiers during marches and in battle. The Olmec had spread cacao northward through trade with their neighbors. It was probably the Maya, over 1500 years ago, who brought Cacao to Yucatan now called Mexico.

Although Christopher Columbus, an Italian admiral for Spain, appeared to have "discovered" cacao beans as a type of almond in 1502. He stole the cacao beans from a Mayan trading vessel and brought to King Ferdinand and Queen Isabella of Spain in 1504. The beans, however, were overlooked. In 1519, Spanish explorer Hernan Cortès conquered part of Mexico. He tried and liked the drink offered by the Aztec and was credited for sending cacao beans back to Spain in 1528.

Point of origin, distribution, and introduction of cacao plant in Philippine soil

Figure 1. Known origins of cacao plants in Northern Amazon Basin (Source: internet materials)

ISSN 2599-4646 (Print) *www.psurj.org/jonas* ISSN 2599-4654 (Online)

Upon the discovery of cacao beans in 17th century as source of chocolate drink by Spain, other European mercantile nations began cultivating cacao in claimed lands. The Dutch had taken over cacao plantations in Curacao island in 1620. Spanish friars grew cacao in Ecuador in about 1635. France introduced cacao to Martinique and Sta Lucia in 1660, the Dominican Republic in 1665, Brazil in 1677, the Guiana in 1684 and Grenada in 1714. England had cacao growing in Jamaica in 1670. The Portuguese brought cacao in Ghana, Africa in 1879.

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In 1670, a Spanish galleon transported single pure Mesoamerican Criollo cacao plant leaving from the port of Acapulco, Mexico across the Pacific to the Philippines. This was brought by a navigator, Pedro Brabo de Lagunas to give the plant to his brother, Bartolome Brabo, a priest in Camarines Norte. But, the plant was stolen by a Lipa native, Juan de Aguila, who hid and took care of it, and propagated all the original Philippine stock.

Cacao's further cultivation in the country was credited to General Jose Basco (1178-1789). He was the first one to give attention to the development of agriculture and the establishment of Royal Company to improve the country's economy. The Royal Company , a March 1785 Spanish decree, promoted direct trade between the colony and Spain and developed agriculture by setting aside 4% of its profit. Although the company was a failure because of mismanagement, it helped in the further development of agriculture particularly the production of exports like indigo, sugar, spices, cacao, and others.

Prior to the arrival of Spaniards, the Filipinos practiced clearing a hillside or a patch of land by cutting down or burning the plants and trees, removing the rocks, and creating a hole through pointed stick and placing the seeds. The farmers simply waited for the rain and harvest time. The Spanish missionaries changed this slash-and burn agricultural practice by teaching the Pilipinos new techniques requiring intensive use of land through irrigation and water management.

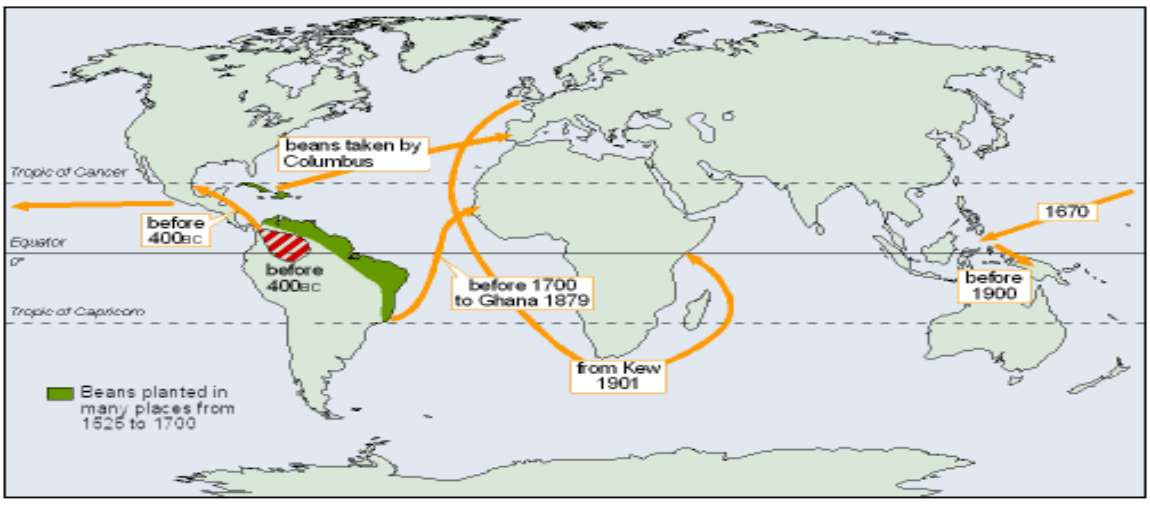

Figure 2. Global movement of cacao (Source: internet materials)

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The seeds or beans of almost ripened cacao fruit were carefully selected. The beans were wrapped in pieces of cloth soaked in water, and were placed in earth-filled seven inches length bamboo tubes once sprouted. When the seedlings fully developed, the bamboo tubes were simply broken and transplanted into holes of 15 inches in diameter, and dug at intervals of 8 feet. Just before planting, the holes were filled with rice straw, then burnt to exterminate all insects that attack the cacao plant. The burnt rice straw served as fertilizer.

Another cultivation method was to work the ground into furrows and cacao beans were placed at intervals of a foot and a half. These were covered with rice straw and kept damp until they sprout. The cacao seedlings once fully developed were transplanted under the shade of trees, coconut or banana.

The system of planting or cultivating different agricultural crops and forest crops termed agroforestry was unknown to many during those time.

Today, the system still exist in the western portion of the province, Bugallon, Aguilar, Mangatarem, Labrador, Sual, Alaminos, Mabini, Burgos, Dasol, Agno and Infanta. The agroforestry with cacao were established mostly by Integrated Social Forestry Program beneficiaries or Certificate of Stewardship Contract holders (households) in the late 1980s. The program was under the regulation of the Bureau of Forestry (BFD) now called the Department of Environment and Natural Resources (DENR). The cacao trees were recommended by the technical expert of BFD to maximize land productivity, enhance ecological stability and improved socio-economic condition of the CSC holders. The program agreements were issued for 25 years and renewable for another 25 years and required the retention or establishment of 20% of the area awarded as permanent forest cover and planting of fruit trees like cacao and installing soil and water conservation measures.

After four or five years from the date of planting, flowering, fruiting and ripening period of cacao generally occurred at two seasons of the year. The most abundant crop was obtained at the beginning of the dry season, and the fruit continued to ripen for two months or longer. Cacao pods approaching maturity were easily recognized by the unmistakable aroma of chocolate and by turning reddish or yellow in color depending on the variety.

The pods attached by a very short stalk to the trunk of the tree, and those within the reach of the hand were carefully cut with shears. Higher pods were most safely removed with an extension pruner or climbed by a barefooted person. The gathered ripe pods were thrown into the heaps and opened with knife within twenty four hours.

The seeds were detached from the pulp, sorted and graded on the spot. The uniformly large size, well-formed and thoroughly ripe were placed in a jar half filled with water. Meanwhile the deformed, small and imperfectly matured seeds were placed to the other jar also half filled with water. The seeds were allowed to stand in their own juice for a day, taken out and washed in fresh water. The beans were dried in the sun for two to four days depending on the weather condition. Much of the dried beans obtained were free from bitterness, and of excellent quality.

Cacao (*Theobroma cacao*) is one of the 22 species of genus *Theobroma* classified under the family Sterculiaceae. The generic name was derived by Linnaeus from the Greek for "food of the gods"; *theos* meaning "god," and *broma* meaning food". The specific name *cacao* was derived from the native name of the plant in Mesoamerical languages.

Cacao, a small shade tolerant, moisture loving, understory tropical rainforest evergreen tree that could grow in slightly acidic soil to an elevation of 1,000 meters above sea level attaining a height of 15 meters. The trees could live for up to 100 years and has a 2 meter deep taproot when naturally grown. The main stem called the chupon with smooth brown bark could grow single for 1.5 meters and then spreads into layers. Its leaves are alternate in arrangement, entire with petiolate and lanceolate shape and smooth on both sides, and measured approximately 10–40 cm (3.9–15.7 in) long and 5–20 cm (2.0–7.9 in) broad. It is deciduous, looses it's leaves with new leaf growth in 2 to 4 times a year. Shade leaves are longer than sun leaves. Mature leaves are dark green in color. Young leaves are reddish, and hang vertically to minimize sun damage. Cacao leaves can move 90 degrees from vertical to horizontal and back to get better sun access to protect young leaves.

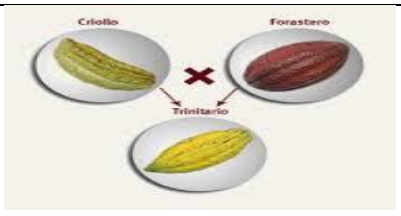
ISSN 2599-4646 (Print) *www.psurj.org/jonas* ISSN 2599-4654 (Online)

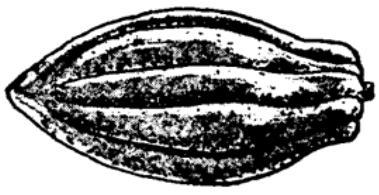
Table 1. Taxonomy and nomenclature of cacao

Rank	Scientific Name and Common Name
Kingdom	Plantae – Plants
Subkingdom	Tracheobionta– Vascular plants
Superdivision	Spermatophyta– Seed plants
Division	Magnoliophyta– Flowering plants
Class	Magnoliopsida– Dicotyledons
Subclass	Dilleniidae
Order	Malvales
Family	Sterculiaceae – Cacao family
Genus	*Theobroma L.* – *Theobroma*
Species	*Theobroma cacao L.* – *cacao*

Flowers are small, 1–2 cm (0.39–0.79 in) diameter, with pink calyx and produced in clusters directly on the trunk and older branches. Most of the world's flowers are pollinated by bees (Hymenopter) or butterflies/moths (Lepidoptera), cacao flowers are pollinated by tiny flies, *Forcipomyia midges* in the order Dipter. The fruits called cacao pods when mature turns yellow, orange, red or purple and are produced throughout the year. The pods vary significantly in size, shape and texture. They range from about 10 cm to greater than 40 cm in length. It took 4 to 5 months to achieve the pod size, and then yet another month to ripen. They have 5 to 10 veins or longitudinal ridges and are spherical to oblong, shaped roughly like an American football.

The pod weigh about 500 g and contains 20 to 60 seeds called "beans", embedded in a white, juicy, delicious pulp. Fresh seeds were white and the inside of them is rich brown, with the taste of unsweetened cocoa powder. The best cacao seeds are large, full and heavy, smooth, with a light chestnut-brown color, dry, not musty, with an agreeable odor and a mild bitter, fatty taste. When the kernels are separated from the shell, their color are shining violet-brown





Criollo	Forastero	Trinitario

Source: internet materials

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The **Criollo** also known as porcelana cacao is found only in the Philippines and Ecuador. The beans are the most sought after because of its rare and high quality i.e. less bitter, more aromatic, but highly susceptible to pest and diseases.

Forastero variety is known for its sturdiness and wide adaptation. It shows varying degrees of reactions to the pests and diseases of cacao, ranging from highly susceptible to resistant. Beans are harder than Criollo.

The **Trinitario** belonged to the Forasteros, although they descended from a cross between Criollo and Forastero. It produces high quality beans (from the Criollo parents) and possess the resistance and vigor of the Forastero parent.

Table 2. Cacao parts and their uses

Parts	Uses
Roots	Root decoction is used to promote or stimulate menstrual flow and labor by stimulating uterine contractions.
Leaves	Leaf litter under the trees create habitat for the main pollinator of cacao, the humble midge. In South America, leaves are being used medicinally for listlessness, snakebites, and as a diuretic. It is also used to treat skin problems such as burns, and stomach complaints. It can be used as lighting fixtures.
Fruits/pod husks	Pectin found in fruit is used in fillings, medicines, sweets, as a stabilizer in fruit juices and milk drinks, and as a source of dietary fiber. It is also used in cosmetics for its thickening and emulsifying properties. It is considered as the solution to an increasing waste management problem.
Fruits/pod husks	Cocoa husks are also used for animal feed. After drying in a field for 1-2 weeks, the husks are then incinerated with the resulting ash being used to make soap.
Pulp	Fresh cocoa pulp juice is made into an alcoholic beverage or soft drinks in some tropical countries.
Shells	The shells are used as garden mulch, and for an energy source to heat some cocoa manufacturing plants. They are also sometimes crushed to extract any residual cocoa butter, as cocoa replacer, fat bloom inhibitor and ingredients in other foods.
Seeds or beans	The main ingredients in making chocolate or tablea tsokolate.
Cocoa butter	The aromatic cocoa butter is an excellent remedy for dry skin leaving the skin soft and supple. It is a remedy for arthritis and heart diseases. The antioxidants which exist as flavonoids in cocoa butter, are known to fight the free radicals present in the body.
Cocoa powder	The grounded or crushed beans without the butter is called cocoa powder. It is usually used in baking and preparing drinks and ice cream
Cacao or chocolate waste	Cacao wastes are used as fertilizer, and feedstock or fuel for energy

ISSN 2599-4646 (Print) *www.psurj.org/jonas* ISSN 2599-4654 (Online)

Profile of cacao, its uses, chemical content and benefits

Raw cacao beans have more than 300 chemical compounds and have the highest antioxidant value of all the natural foods in the world. It contains anandamide (a euphoric substance), arginine

(a natural aphrodisiac), neutransmitters that stimulate and balance brain activity, tryptophan (an anti-depressant), antioxidants and other beneficial compounds known to have rejuvenating and anti-ageing elements. It is high in magnesium, essential for helping the heart to pump blood efficiently, building strong bones, and lowering blood pressure. Cacao is a good source of the beauty mineral sulphur, responsible for healthy skin, nails and hair.

The Aztec recipe for *xocoatl* (chocolate drink) brought by Cortez to Spain was improved by adding sugar. It became a popular drink and the Spaniards kept the discovery of adding sugar to the drink a secret from the rest of Europe for almost a century.

The process of making a homemade chocolate drink from the beans of cacao was observed by Pilipinos through serving the Spanish missionaries and rulers. The Pilipinos grew the fruit and usually made their own chocolate at home by roasting the beans over a slow fire, separating them from their husks (like almond−skins). After pounding with using a kind of rolling pin on a concave block of wood, it turned into a paste called chocolate liquor. The roasted beans were made into chocolate at once. To counteract the natural bitterness of the bean, sugar, vanilla, cinnamon, etc were added. In making the paste, a large quantity of sugar was added, varying from one−third of its weight to equal parts, whilst one pod of vanilla was sufficient for 1 1/2 lbs. of cacao. These were shaped into medium-sized thick discs called 'tablea tsokolate', which were then diluted in hot or boiling water and sweetened with raw sugar, milk or honey. The beverage was the favorite of the Spaniards and the better class of natives. In every household, the morning or afternoon caller was invited to “almusal or merendar con chocolate” partnered with with the native puto of Calasiao or suman and mango. Nowadays, the beverage is served anytime in food chains.

Cacao has a potential of boosting the economy of the province. The beans alone when sold dry is priced at P100-P150/kg. The 1 kilo dried or roasted beans will produce 12-14 packs of tablea tsokolate using ¾ kg of muscovado or brown sugar. Each pack of tablea tsokolate is priced at P120.00 or even higher with no or less sugar. The by-products when sold or quantified will also increase the income of a farmer.

Consider the following:

18-25 pods = 1 kilogram of wet beans

3 kg of wet beans = 1 kg of dry beans

1 cacao tree produces 2-3 kg of dry beans per year

1 hectare = 750 cacao trees interplanted with other crops (coconut & banana)

1 hectare of 750 cacao trees will produce (2 kg/yr) 1,500 kg of dry beans per year

1 hectare = P50,000 pesos in expenses (25,000 pesos for seedlings, 25,000 pesos for labor)

Labor include fertilizing, clearing, holing, staking, weeding, etc.

Financial Impact of Cacao dried beans

Price of dry cacao beans in the market P100-150/kg

1,500 kg dried beans x P100/kg = P150,000.00

Less P50,000 labor and materials = P100,000 net income

Financial Impact of Cacao dried beans

Tablea tsokolate is sold at a price of P120

1,500 kg of dried or roasted beans will produce 21,000 packs of tablea tsokolate

21,000 packs of tablea tsokolate x P120 = P 2,520,000

Less price of sugar, fuel, packaging paper, and labor = maximum of 20% of the gross income , around P500,000 = P2,000,000 net income

ISSN 2599-4646 (Print) *www.psurj.org/jonas* ISSN 2599-4654 (Online)

CONCLUSION AND RECOMMENDATION

Cacao (*Theobroma cacao)* is a tropical plant of the family Sterculiaceae. It has many uses and by-products from husk, shell, pulp, and beans. Its beans are known to have the highest antioxidant value of all the natural foods in the world. In areas in the Philippines including Pangasinan where cacao is grown, it is not uncommon to see tablea tsokolate a home-made chocolate from the beans of cacao. In Pangasinan, tablea tsokolate is usually partnered with the native puto of Calasiao or suman and mango for breakfast or snacks. Because of the plant's growth habit and characteristics, cacao is one among the agroforest species being promoted by the Department of Agriculture and the Department of Environment and Natural Resources to maximize land productivity, enhance ecological stability, and improve socio-economic condition of the farmers.

With a constant soaring price of cacao beans per kilo and tablea tsokolate in the market due to local and global demand, cacao has the potential to boost the province economy. The Department of Agriculture, Department of Environment and Natural Resources, Department of Tourism, Office of the Pangasinan Agriculturist, research institutes, Local Government Units, farmers organization, and other entity need to harmoniously work to promote the commodity and put up an agroforestourism in the province. This will showcase the sustainable cultivation of agriculture and forestry species suitable in the Pangasinan soil and the processing of these agroforest products particularly cacao. The agroforestourism will also educate the youngster to appreciate, perpetuate and promote cacao and tablea tsokolate (Spanish legacy) which impacted the agroforesty, culinary and economy of the province.

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ISSN 2599-4646 (Print) *www.psurj.org/jonas* ISSN 2599-4654 (Online)

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