

# Patia Valley: Development of Legal Crops

H.R. Winogrand

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Colombia Alternative Development Project



Chemonics International Inc.  
1133 20<sup>th</sup> Street, NW  
Washington, DC 20036  
Telephone (202) 955-3300  
Fax: (202) 955-7540

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# **Valle del Patia**

## **Desarrollo de Productos Licitos**

**Prepared for CAD/Chemonics, Intl.**

**By: H.R.Winogron**

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# I. Background

The Valley of Patia is located in the southwest of Colombia, in the Departments of Cauca and Narino. It is a total of approximately 30,000 hectares, located between the Central and Western Cordilleras. It is defined principally by the Patia River, along an extension of 300 kilometers, moving through the Western Cordillera and exiting in the Pacific Ocean. This is the second largest river in the Pacific extension of Colombia in terms of volume, and the longest, in terms of kilometers of extension. The Patia Valley occupies approximately 6 Municipios of Cauca and ten Municipios in Narino. (Please see Exhibits 1 and 2. )

The zone is generally warm, averaging approximately 1,500 meters in altitude. Rainfall is sporadic, and there has been a process of virtual desertification in some parts of the Valley, making sustainable agriculture continually more problematical.

The following is taken from the writer's report to Chemonics concerning the Department of Cauca:

"Due to our inclusion of the largest Municipio, El Tambo, in the region, it contains over 17% of the total land area in the Department, and over 12% of the population. This is because the southern part of El Tambo is much more similar to the Patia Municipios that it borders, such as Patia, Argelia, and Balboa, than the large Chocoana Municipios that lie to the northwest.

But these Municipios are unique in this part of the Andes for having a very large Afro-Colombiano population, descendants of the slaves brought to the country 300-400 years ago. The culture, music, societal structures, etc., all reflect the African heritage of the people in this area. They are very conscious of their unique inheritance, and this dominates all contact with them.

The Valle de Patia itself is found in the Municipio of Patia, and is flat, very dry, and due to the constant presence of a relatively large population for several centuries now, has suffered large losses in forest cover. Water is available, both in the Patia River and in subterranean sources, but though irrigation projects for the area have been studied, none have been implemented, greatly restricting the current agricultural capabilities of this zone. The valley also still includes many large hacendados that are used mostly for cattle, and this also has restricted the agricultural development. However, as the guerrilla presence is relatively strong in this area, many of the original landowners can no longer visit their farms, and unique opportunities exist at this point for local organizations to examine either the purchase or rental of these lands.

The Pan-American Highway runs through much of the Zona Patia, and as such there is excellent access to Popayan, Pasto, and Cali. Relatively good roads are found in the rest of the zone as well.

With the good transportation, the area has a solid tradition of fruit production, including papayas and watermelons at the low levels, and lulu, tomate de arbol, and mora at the higher elevations.

However, in spite of having some solid prospects for economic development, the current NBI levels are very high here, being 43.6% worse than the Departmental average, and 109.5% above the national average.

This is an area with a very high incidence of illicit crop cultivation, with approximately three fourths of the coca in the department, and nearly one fourth of the poppies. The good news, however, is that due to the good transportation, presence of water, and very evident and strong desire of the community leaders to escape from the damage done by the drug cultivations, the potential for a successful implementation of alternative crops is relatively high. “

The following is taken from the writer's report to Chemonics concerning the Department of Narino:

“The Patia area in Nariño is essentially an extension of the same found in Cauca, an additional 10 Municipios found in the general area of the Patia River. As in Cauca, the area is relatively dry and warm, with the economy revolving around cattle, some citrus, and some hot climate fruits. There is only fair access here, with the exception of the area near the Pan American highway. This is a relatively large area ( over 10% of the Department ), and has historically been very poor. The NBI level here is 42.2% over the national level. Combined with all of the other factors, the presence of a high level of illicit crops comes as no surprise. The official statistics indicate that Patia has around 5.0% of both the coca and amapola in the Department. However, local government officials told us that Leiva alone has over 4,000 hectares of coca. Cumbitara is ostensibly planted to a great density of coca, and Policarpa is well known for its coca seedbeds. Inevitably, Los Andes is reported to have a strong presence of guerrilla. “

## **II. Illicit Crop Production**

Perhaps because of the agricultural background of the zone, or because of the generally good access and the low levels of income, the Patia area has become a significant producer of illegal crops, primarily coca. In Exhibits 3 and 4 we can see the official

government statistics for the levels of illicit production in this zone. However, as mentioned above, the official statistics do not begin to reflect the reality of illicit plantings, as reported to us by local officials and residents. In attempting to calculate the true volume of coca planted in this area ( as the warm, dry portion of Patia is almost exclusively concentrated in coca, not amapola ), we were advised that a safe figure would be 25-30% of the total area planted ( of any kind of agriculture. ) would have coca planted there.

### **III. Social Organization**

The primary reason for placing the highest priority for the eradication of illicit crops and the development of licit industries in the Valley of Patia was the level of social organization led by the organization of FUNDEBAP ( Fundacion para el Desarrollo del Bajo Patia ). Based primarily on the ethnic association among the AfroColombianos in this area, a very high level of organizational structure and capability exists in the region. Many local organizations exist including:

1. CORPATIA – an organization dedicated to the regulation of water assets.
2. ASMET – an organization dedicated to health and training.
3. COAGROUSUARIOS – an organization dedicated to the support of research.
4. AFRORIOPATIA – another organization dedicated to water assets, particularly along the Rio Patia.

Several other organizations exist as well, but the overall umbrella organization is FUNDEBAP, led by Dr. Carlos Erazo. This particular organization has been successful in raising money to fund various projects. They also are the owners of 107 hectare farm, La Pachuca, located in the center of the Patia zone, right along the Pan American highway. This asset is particularly useful for many purposes in a project such as this, in terms of demonstration plots, a location for training, etc.

The conclusion in this area is that any project of this sort has no chance of success without community support. We found this area to be nearly unique in having a community seemingly united in a desire to drive the drugs away from their culture, having recognized that their particular culture, which they treasure as being the binding force that unites their communities, is being destroyed by the drug culture. With FUNDEBAP, we have an organization that has the respect and support of the entire community, including all of the other local organizations, and they support FUNDEBAP in this difficult effort.

## RULES OF THE GAME

In the process of discussing the project with the community leaders, we quickly gained a sense of their local support when the “ Rules of the Game “ were made clear to them. This is not an easy process, but it became clear that the leaders with whom we spoke and worked understood the rules, understood the rationale behind the rules, and were willing to place a portion of their authority and prestige behind the implementation of the rules, in order to have a successful project. The rules were as follows:

1. A community will for voluntary eradication.
2. Immediate eradication, upon the approval of the project.
3. A community consensus for the total eradication of illicit crops in any defined nucleus.
4. A community determination for social conversion.
5. A clear sense of a community understanding of the conditions of the program.

Obviously, this was going to require a significant social and community effort, and the leaders were already beginning the planning for the sales effort, including the composition of songs dedicated to drug eradication.

## IV. Nucleus Definition

In beginning the work with the community leaders to determine exactly where in the Patia Valley the development work would be carried out, it was determined that various community nuclei would be defined. This was necessary for two purposes. First, we had to know exactly the communities we would be involved with, in terms of the numbers of families, the numbers of hectares involved, the names of the leaders, and ultimately, the names of the individual families who would be eradicating the illicit crops. In addition, we wanted to define exact polygons, in terms of geographic area, as it was explained to the leaders that the future for them held very clear alternatives. Within these specifically defined polygons ( or at least clear geographic areas, with some of the borders perhaps being defined by natural boundaries, such as a river ) there would be a complete, voluntary and immediate eradication of drugs. And outside of these nuclei there was a high likelihood of fumigation.

In Exhibit 5, the details of the nuclei defined for the Patia area of Cauca can be seen. Working together with the FUNDEBAP leaders, and using their knowledge of the geography, the actual communities and the probabilities for success, seven nuclei were defined. Based upon actual census data, the 60 veredas in these nuclei have a total population of nearly

20,000 people. Assuming approximately 5 members per family, this gave us a total of approximately 4,000 families. In addition, we were advised that the average family in this area has 1.5 hectares of land. Based upon this assumption, we have made the calculation that the 4,000 families have approximately 6,000 hectares of land under cultivation. In addition, we were advised that approximately 25% of this land could be assumed to be planted to coca, which in turns gives us our calculation of approximately 1,500 hectares of coca planted in these nuclei. The summary for all of this can be seen in Exhibit 6.

## V. Supporting Organizations

While FUNDEBAP is the pivotal organization for community support, it was necessary to locate and interview several other organizations for organizational and vocational support. The key here was to insure that the entire productive chain, from planting through to the ultimate sale of the product, was covered. The following organizations were determined to be the most appropriate for both a role of overall leadership as well as leading the specific implementation of various products.

**A. CORPOTUNIA** - Corpotunia is an organization that is 16 years old, founded by Carvajal y Cia. Fidefues, and other entities with the intention of assisting in agricultural and artistic development in Cauca. ( The small town of Tunia is located near Piendamó, in the Meseta of Popayan. )

They have a full time staff of 5 people, and an additional 60 working in five different lines of products, including ceramics and other handicrafts, caña panela, cold climate fruits, and aquaculture. They provide technical assistance, marketing assistance, do market studies, and become involved in the social aspects of their projects as well. They also provide in specialized assistance in the area of the creation of small businesses.

They have a very deep level of experience in two products that are important for us, which are caña panelera and medicinal and aromatic plants, and condiments. They also have a lot of experience in cold weather fruits. They have an excellent reputation in the area, and would be a very likely candidate to assist the broad package projects in these specific areas. We felt that this organization is the best suited to assume an overall leadership role in the project, in addition to specific functional responsibility in Caña Panelera, Piscicultura, and Chontaduro.

**B. COSURCA** - COSURCA, the Corporacion del Sur de Cauca, is one of the most respected organization in the area, and one with which we should

definitely consider becoming involved. Their reputation is excellent, in terms of the technical and marketing assistance they provide, as well as their ability to work with campesino organizations on social and economic programs. Their largest current project is with organic coffee, where they work with 700 families in the organic trade and another 900 families in “café social”. They are ostensibly the largest shipper of organic coffee in the country. As such, they have strong contacts with organic buyers in the U.S., as well as “Fair Trade” coffee buyers in the U.S. and Europe. This year they will ship more than 13 containers of both kinds of coffee, and they are currently sold through 2003. They would like to double the size of their coffee growing, by another 700 families and 800 hectares, but do not have the funds to do so. They have also worked with the production and sale of papaya and lulo, and they manage the sales directly into the supermarket chains of Colombia, such as Carrefour. They have worked with many of the organizations with whom we are considering working, such as FUNDEBAP, and come highly recommended by everyone. Given their very specific expertise in fruits and vegetables, it is felt that they should assume the vocational leadership role in the implementation of these products, which are the economic cornerstone of the project.

**C. CONIF** - CONIF, the Corporacion Nacional de Investigaciones y Fomento Forestal, is a mixed ( private and public ) company that is working with Chemonics in all of the areas involving forests and wood products. They have a work plan for Cauca that includes reforestation, with new plantings that can be directly tied to eradication, and the maintenance and improvement of existing plantings that will be studied to determine if they can be combined with other larger projects that involve eradication through the planting of food and other crops.

The program of CONIF with Chemonics has contemplated the planting of 400 hectares of new forests within Cauca and Nariño. In Cauca, the areas to be planted lie exactly within the Zona Oriental, one of the areas of high priority for the eradication of illicit products. As such, this program will be considered for combination with one of the large programs of Chemonics in this area ( either that of the Comité de Cafeteros, the University of Cauca, or directly with one of the indigenous organizations ). This will mean a more complete package program for the area, which can now include food crops, other crops such as fique or mulberry for silk, and now reforestation. In addition, the participation of COOTRAFORC, given their deep level of experience in the area, will be considered.

Another, perhaps more appropriate application of this opportunity would be to include all or a portion of the 400 hectares within the Patia project mentioned

above. This is intended to be a fully integrated project involving several different economic alternatives that will have payback periods ( the time necessary to produce a positive cash flow from the project ), ranging from three months to several years. However, given that the package will focus on high value fruits and vegetables, with rapid payback periods, this is a solid opportunity to combine the planting of the 400 hectares of very long lead time forestry products with the others, so that the local residents will have economically sustaining investments while the environmentally appropriate and long term economic investments of the trees are maturing. If all of this makes sense, CONIF should move forward soon to prepare the seedbeds for the planting materials for the tree varieties that are considered to be appropriate for the local conditions. In addition, CONIF will hopefully become involved in the totumo for Patia, in terms of defining the agricultural practices, assisting in variety selection, etc..

**D. FONDO GANADERO** – The Fondo Ganadero is the most respected organization in Colombia in terms of both dairy and beef cattle, and they have committed to assisting us in the development of any project in the Patia area involving cattle. This would mean assistance with the purchase of cattle, as well as the establishment and/or improvement of pastures. In addition, Freisland, the largest milk and milk products company in this part of Colombia, has committed to the purchase of any milk products produced by our nucleus members.

**D. ASPROME** - ASPROME is an organization made up of 9 separate campesino organizations, with a total of approximately 2,000 families. The organization is 16 years old, and they own a fruit processing plant in Palmira, near the Cali airport, about 2 hours from Patia. The plant is only a couple of years old, is just now coming into production, and was financed with EU money. The plant has the capability of producing fruit pulps, marmalades, dried fruit, and can also process fruit seeds for oil. They are currently processing and exporting organic marmalades to Germany and Switzerland. They also sell some fresh fruit into the Colombia supermarkets.

They also have a processing plant in Patia, which produces a lower quality grade of marmalade.

Up to now, they have worked only with organic products, as they feel that they would have a hard time competing on the international market with non-organic. They are currently working with banana, pineapple, mango, guayaba, and maracuya products.

They handle all of the selling and marketing, and provide technical assistance to the members. They have also financed certain irrigation projects in Patia. They are only working at a small fraction of the plant's capacity, and though any increase in sales would go to their members first, they have a good reputation, and are a very likely candidate to assist with the sales of fruit products from all of our locations in Cauca.

**E. COOPICA/PRONAR** – The business of “ apicultura “, or beehives and the production of related products, has extraordinary possibilities in this area. Through PRONAR and Products Arroyave, we have a private company that will assist in the development of all of the new hives, as well as the sale and marketing of all of the products produced. COOPICA is the cooperative of honey producers, and is perfectly suited for the training of all of the new honey producers.

#### **F. FUNAVI**

#### **G. FUNDIC –**

**H. IRRIGATION** – In the following section, the economics of most of the products are based upon the successful implementation of irrigation in the area. This subject was thoroughly investigated in Popayan, including having an all day session at the University of Cauca, where we invited in irrigation experts from many sectors of the economy and society, including experts from the University of Cauca and the University of Narino.

There are two aspects to the installation of an irrigation system; the first is the development of a water source, and the second is the development of a water distribution system.

The latter part is not something, I feel, of great concern. There are now many low cost water distribution systems developed all over the world, including drip irrigation systems, micro-aspersion systems, etc. We received a specific proposal from the most well known expert in the entire area, Dr. Lucio Legarda of the U. of Narino, who has developed systems specifically for Patia. In addition, we received information from systems developed in Nicaragua and Africa, which would have specific application to Patia. It appears almost certain that the water distribution system can be developed for approximately 2,000,000 pesos per hectare.

The initial part of irrigation implementation, the securing of an economic source of water, is always more difficult. All of the irrigation projects in this area have relied on large-scale districts, bringing in water via gravity flow from the

mountains in the area. However, given the very specific nature of our project, this simply doesn't make sense, as we are targeting specific veredas in well-defined areas. Here it makes much more sense to install wells with a sufficient water volume necessary for the area to be irrigated. Our initial inquiries in the area indicated that subterranean water exists in large quantities in the zone. ( There seemed to be some question in certain areas about the levels of water salinity. I find it difficult to believe that this is a problem at the depths necessary to provide the desired water volumes, but it must be investigated. ) The initial calculations made with the experts indicated that a well with the capacity of irrigating 200 hectares, which means a flow of 200 liters per second, could be placed for less than 1,000,000 Pesos per hectare.

The very difficult part of managing deep wells is the maintenance and repair. This is not easy, and requires very competent, full time crews. Due to this necessity, I have increased the total investment for irrigation to 4,000,000 Pesos per hectare, to cover the initial investment costs for both the water source and the water distribution systems, as well as to provide funds for the establishment of the maintenance crews.

It should be noted that we also received a proposal from the Comité de Cafeteros of Cauca for a water source development project. While I doubt that this will serve our purposes, anything coming from the Comité de Cafeteros needs to be considered very seriously.

( I would like to add here that this seems an ideal project for an organization like FUNDEBAP, which would ideally own the system, manage it professionally, and charge the community members for its use. )

## **VI. Recommended Projects**

I have listed below the products that I feel would be economically successful in this area. They are grouped in four general categories:

1. Community Based – Here we have totumo and guandul, the bean that is most appropriate for local production. Totumo is a cornerstone of the local culture, and will provide solid long-term economic sustenance in various areas.
2. Vocationally Based – The products that we have suggested for earning cash ( as well as local consumption ) are hot climate fruits, vegetables, corn, milk and milk by-products, and “ piscicultura “.

3. Reforestry – Here, we have both the totumo, as well as the CONIF possibilities.
4. Regional Competitive Products – The products that would enjoy the support of the government competitiveness project would be Caña panelera, “ Apicultura “, and Chontaduro.

Following are the economic details for the recommended products. All prices and costs are in Colombian Pesos:

- |                            |                    |
|----------------------------|--------------------|
| 1. Product:                | White Corn         |
| Operating Entity:          | COSURCA/FUNAVI     |
| Investment/Hectare:        | 1,000,000/Crop     |
| Time to First Harvest:     | 120 Days           |
| Time to Full Production:   | Same               |
| Assumed Productivity:      | 4.5 Tons/Crop      |
| Selling Price:             | 320,000/Ton        |
| Net Earnings/Hectare/Year: | 1,100,000          |
| Notes:                     | 2.5 Crops/Year     |
|                            |                    |
| 2. Product:                | Watermelon         |
| Operating Entity:          | COSURCA            |
| Investment/Hectare:        | 2,320,000          |
| Time to First Harvest:     | 120 Days           |
| Time to Full Production:   | Same               |
| Assumed Productivity:      | 10 Tons/Ha/Year    |
| Selling Price:             | 600,000/Ton        |
| Net Earnings/Hectare/Year: | 9,200,000          |
| Notes:                     | 2.5 Crops/Year     |
|                            |                    |
| 3. Product:                | Papaya             |
| Operating Entity:          | COSURCA            |
| Investment/Hectare:        | 7,500,000 – 2 Yrs. |
| Time to First Harvest:     | 9 Months           |
| Time to Full Production:   | Same               |
| Assumed Productivity:      | 36 Tons – 2 Years  |
| Selling Price:             | 450,000/Ton        |
| Net Earnings/Hectare/Year: | 8,700,000          |

Notes:

Prod. for 15 Months

4. Product: Peanuts  
Operating Entity: COSURCA  
Investment/Hectare: 1,320,000  
Time to First Harvest: 100 Days  
Time to Full Production: Same  
Assumed Productivity: 1.2 Tons/Crop  
Selling Price: 1,600,000/Ton  
Net Earnings/Hectare/Year: 700,000  
Notes: No By-products
5. Product: Caña Panelera  
Operating Entity: Corpotunia  
Investment/Hectare: 1,830,000 – Improvement  
1,000,000 – Trapiche  
1,250,000 - Maintenance  
Time to First Harvest: 12-14 Months  
Time to Full Production: Same  
Assumed Productivity: 60 Tons/Hectare  
Selling Price: 35,000/Ton  
Net Earnings/Hectare/Year: 850,000 Every 12-14 Months  
Notes: Good for 6-7 Cuttings
6. Product: Piscicultura  
Operating Entity: Corpotunia  
Investment/Hectare: 1,000,000/Tank  
3,900,000 Operating Costs  
Time to First Harvest: 5 Months  
Time to Full Production: Same  
Assumed Productivity: 1,250 Kg/Harvest  
Selling Price: 5,000/Kilo  
Net Earnings/Tank/Year: 5,875,000  
Notes: 2.2 Harvests/Year
7. Product: Chontaduro

Operating Entity:	Corpotunia
Investment/Hectare:	3,400,000
Time to First Harvest:	6 Years
Time to Full Production:	10 Years
Assumed Productivity:	4 Tons/Ha –Year 10
Selling Price:	1,000/Kilo
Net Earnings/Hectare/Year:	3,300,000 – Year 10
Notes:	Strong/Growing Market

8. Product:	Apicultura
Operating Entity:	COOPICA/Pronar
Investment/Hectare:	5,200,000 – 20 Hives
Time to First Harvest:	3 Months
Time to Full Production:	Same
Assumed Productivity:	40 Kg/Hive/Year – Honey 10 Kg/Hive/Year - Pollen
Selling Price:	3,500/Kg – Honey 10,000/Kg - pollen
Net Earnings/Hectare/Year:	3,120,000
Notes:	Based on 20 hives. Can increase to 50 hives/family with experience. Operating costs = 40%.

9. Product:	Totumo
Operating Entity:	CONIF/Coagrousuarios
Investment/Hectare:	500,000
Time to First Harvest:	30-36 Months
Time to Full Production:	5-6 Years
Assumed Productivity:	15 Tons Pulp/Year 30,000 fruits/Year
Selling Price:	150,000/Ton of Pulp 50/Fruit
Net Earnings/Hectare/Year:	2,000,000
Notes:	

10. Product:	Tomatoes
Operating Entity:	COSURCA
Investment/Hectare:	4,000,000
Time to First Harvest:	90 Days

Time to Full Production:	Same
Assumed Productivity:	28 Tons/Ha/Year
Selling Price:	300,000/Ton
Net Earnings/Hectare/Year:	11,000,000
Notes:	2.5 Crops/Year
11. Product:	Melon
Operating Entity:	COSURCA
Investment/Hectare:	3,500,000
Time to First Harvest:	90 Days
Time to Full Production:	Same
Assumed Productivity:	30 Tons/Crop
Selling Price:	300,000/Ton
Net Earnings/Hectare/Year:	13,750,000
Notes:	2.5 Crops/Year
12. Product:	Milk/Milk By-Products
Operating Entity:	Fondo Ganadero/Freisland
Investment/Hectare:	3,000,000 – 3 Cows 1,300,000 – Pasture Improvement Machinery/Equipment
Time to First Harvest:	8 Months
Time to Full Production:	3 Years
Assumed Productivity:	5 Liters/Cow/Day
Selling Price:	500/Liter – Farm Level
Net Earnings/Hectare/Year:	2,100,000
Notes:	Cold tank –5,000 Lit./170 Hectares
13. Product:	Guandul
Operating Entity:	COSURCA/FUNDIC
Investment/Hectare:	1,500,000
Time to First Harvest:	6 Months
Time to Full Production:	12 Months
Assumed Productivity:	8 Tons/Ha/Year
Selling Price:	400,000/Ton
Net Earnings/Hectare/Year:	2,500,000
Notes:	5-7 Year Duration

14. Product:	Bell Peppers
Operating Entity:	COSURCA
Investment/Hectare:	2,700,000
Time to First Harvest:	90-120 Days
Time to Full Production:	Same
Assumed Productivity:	11.9 Tons/Hectare
Selling Price:	480,000/Ton
Net Earnings/Hectare/Year:	7,530,000
Notes:	2.5 Crops/Year

15. Product:	White Onions
Operating Entity:	COSURCA
Investment/Hectare:	4,150,000
Time to First Harvest:	90-120 Days
Time to Full Production:	Same
Assumed Productivity:	10 Tons/Hectare
Selling Price:	540,000/Ton
Net Earnings/Hectare/Year:	3,1250,000
Notes:	2.5 Crops/Year

## VII. Sample Nucleus

I felt that it would be worthwhile to construct a “ sample nucleus “, as we have many different products here, with many variations in timing for coming into production. In addition, we have the heavy up-front investment in irrigation, and it would be useful to look at this as if it were a commercial investment, in terms of a cash flow and period of payback.

First, the following were assumed to be the projects implemented in this sample nucleus:

### Assumptions:

- 200 Hectares of illicit crops to be eradicated
- 500 Hectares of licit production to be planted
- 500 Hectares of irrigation
- 50 Hectares of dairy cattle

- 125 Hectares of White Corn
- 125 Hectares of Guandul
- 100 Hectares of Fruits
- 100 Hectares of Vegetables
- 25 Families with Apicultura
- 10 Hectares of Totumo

The actual spread sheet work can be seen in Exhibit 7. The cash flow by Quarter would be as follows:

#### Cash Flow by Quarter

Year:	Quarter:	Cash Flow	Cumulative:
1°	1°	(1,098,750)	(1,098,750)
	2°	(1,252,000)	(2,350,750)
	3°	(815,000)	(3,165,750)
	4°	1,415,000	(1,750,750)
2°	1°	(710,000)	(2,460,750)
	2°	1,512,000	(948,750)
	3°	(655,000)	(1,603,750)
	4°	1,552,500	(51,250)
3°	1°	(650,000)	(701,750)
	2°	1,558,750	857,500
	3°	(616,250)	241,250
	4°	1,588,750	1,830,000
4°	1°	(616,250)	1,213,750
	2°	1,588,750	2,802,500
	3°	(616,250)	2,186,250
	4°	1,588,750	3,775,000

As can be seen here, based upon these assumptions, the overall project breaks even in the middle of the third year, and is solidly profitable after that.

## VIII. Total Investment

Using the above numbers to calculate the total cost of the Patia investment, I have arrived at the following:

<b>Irrigation – 3,000 Hectares at P 4,000,000/Ha.</b>	<b>12,000,000,000</b>
<b>Product Invest. – 3,000 Has. At 2,500,000/Ha.</b>	<b>7,500,000,000</b>
<b>Administration – at 10.0%</b>	<b>1,950,000,000</b>
<b>Total Cost</b>	<b>21,450,000,000</b>
<b>Total Cost in Dollars</b>	<b>\$7,800,000</b>

# Exhibit 1

## CARACTERISTICAS ZONA PATIA – DEPT. DE CAUCA

<b>Municipio</b>	<b>Superficie KM 2</b>	<b>% de Dept.</b>	<b>Población</b>	<b>% de Dept.</b>	<b>Altura</b>	<b>Temp.Promedio</b>
Patia	786	2.48	30.100	2.40	998	23
Balboa	360	1.14	24.500	1.95	1.630	19
Argelia	320	1.01	26.200	2.09	1.700	24
Florencia	55	0.17	6.100	0.49	1.700	18
Meercaderes	642	2.02	17.800	1.42	1.156	23
Tambo	3.280	10.34	49.800	3.97	1.750	18
Bolivar					1.770	19
Subtotal	5.443	17.17	154.500	12.31		

## CARACTERISTICAS ZONA PATIA

- ❖ LA MAYORIA PLANO, ALGUNAS ALTURAS
- ❖ MUY SECO, BOSQUES PESADOS PERDIDOS EN ALGUNAS AREAS
- ❖ DOMINADO POR AFRO COLOMBIANOS
- ❖ PRESENCIA DE GRANDES GANADEROS Y HACENDADOS
- ❖ NIVEL DE NBI 43.6% SOBRE PROMEDIO DEPARTAMENTAL Y 109.3% SOBRE PROMEDIO NACIONAL

# Exhibit 2

## Características de Patia – Dept. de Narino

MUNICIPIO	SUPERFICIE KM 2	% DE DEPT.	POBLACIÓN	% DE DEPT.
Arboleda	115,0	0,37	7.478	0,45
Cumbitara	280,0	0,91	7.056	0,42
El Rosario	406,0	1,32	15.609	0,94
El Tambo	344,0	1,12	28.578	1,71
Leiva	374,0	1,21	14.220	0,85
Los Andes	809,0	2,63	15.235	0,91
Policarpia	427,0	1,39	12.617	0,76
San Lorenzo	250,0	0,81	17.939	1,08
San Pedro de Cartago		0,00	7.140	0,43
Taminango	284,0	0,92	15.434	0,93
<b>SubTotal</b>	<b>3.289,0</b>	<b>10,67%</b>	<b>141.306</b>	<b>8,47%</b>

### CARACTERÍSTICAS

- Semejante a Patía de Cauca – Muy seca, bastante plana cerca al río Patía
- Zona Ganadera, frutales
- Buen acceso, cerca de la Panamericana
- Bastante coca y guerrilla.

# Exhibit 3

## DETALLE DE CULTIVOS ILICITOS – PATIA DE CAUCA

Zona y Municipio	ANALISIS DE MUNICIPIOS						NO. DE FAMILIAS INVOLUCRADAS		
	Has de Coca	% de Dept.	Has de Amapola	% de Dept	Total de Has	% de Dept.	Veredas	Coca	Amapola
<b>5. Zona Patia</b>									
<b>Patia</b>	220	5.12	20	0.63	240	3.21	20	491	38
<b>Balboa</b>	299	6.96	200	6.27	499	6.67	44	744	330
<b>Argelia</b>	1.300	30.28	29	0.91	1.329	17.76	17	1.100	46
<b>Florencia</b>	35	0.82	25	0.78	60	0.80	8	48	42
<b>Mercaderes</b>	158	3.68	5	0.16	163	2.18	28	216	8
<b>Tambo</b>	1.100	25.62	400	12.54	1.500	20.05	10	580	350
<b>Bolivar</b>	131	3.05	100	3.13	231	3.09	24	230	440
<b>SubTotal</b>	3.243	75.54	779	24.42	4.022	53.75	151	3.409	1.254

# Exhibit 4

## DETALLE DE CULTIVOS ILICITOS – PATIA DE NARINO

MUNICIPIO	Has. de AMAPOLA	% DE DEPT.	Has. de COCA	% DE DEPT.	Tot. de Ilícito	% DE DEPT.
Arboleda	0	0,00	0	0,00	0	0,00
Cumbitara	70	2,88	50	0,47	120	0,92
El Rosario	0	0,00	0	0,00	0	0,00
El Tambo	10	0,41	0	0,00	10	0,08
Leiva	0	0,00	200	1,89	200	1,53
Los Andes	50	2,05	20	0,29	70	0,54
Policarpia	0	0,00	150	1,41	150	1,15
San Lorenzo	0	0,00	0	0,00	0	0,00
San Pedro de Cartago	0	0,00	0	0,00	0	0,00
Taminango	0	0,00	0	0,00	0	0,00
<b>SubTotal</b>	<b>130</b>	<b>5,34%</b>	<b>420</b>	<b>3,96%</b>	<b>550</b>	<b>4,22%</b>

# Exhibit 5

<b>Nucleos</b>	<b>de</b>	<b>Patia</b>		
<u>Patia</u>	<u>Poblacion</u>	<u>Familias</u>	<u>Hectares</u>	<u>Hectares Ilicito</u>
La Florida/Chondural	304	61	91	23
		0	0	0
Potreriillo	200	40	60	15
Patia	307	61	92	23
Piedra de Moler	150	30	45	11
La Ventica	200	40	60	15
Cabuyo	80	16	24	6
El Juncal	150	30	45	11
El Puro	677	135	203	51
Angulo	520	104	156	39
Mulalo	120	24	36	9
El Crucero	80	16	24	6
La Fonda	655	131	197	49
Las Tallas	307	61	92	23
Sajandi	<u>136</u>	<u>27</u>	<u>41</u>	<u>10</u>
<b>SubTotal</b>	<b>3,886</b>	<b>777</b>	<b>1,166</b>	<b>291</b>
<b><u>El Tuno</u></b>				
Salado	200	40	60	15
Agua fria	120	24	36	9
Guachicon	1,300	260	390	98
Las Chulas	200	40	60	15
Guadualito	150	30	45	11
Pendal	150	30	45	11
El Tuno	300	60	90	23
Mendez	<u>170</u>	<u>34</u>	<u>51</u>	<u>13</u>
<b>SubTotal</b>	<b>2,590</b>	<b>518</b>	<b>777</b>	<b>194</b>
<b><u>Mercaderes/Bolivar</u></b>				
Capellanias	600	120	180	45
Cajamarca	500	100	150	38
Los Medios	400	80	120	30
Contador	<u>200</u>	<u>40</u>	<u>60</u>	<u>15</u>
<b>SubTotal</b>	<b>1,700</b>	<b>340</b>	<b>510</b>	<b>128</b>
<b><u>El Estrecho/Las Mojarras</u></b>				
El Estrecho	2,249	450	675	169
La Manguita	350	70	105	26
El Pilon	150	30	45	11

Galindez	497	99	149	37
Palo Verde	250	50	75	19
Mojarras	200	40	60	15
Cangrejo	30	6	9	2
<u>Tinajas</u>	<u>50</u>	<u>10</u>	<u>15</u>	<u>4</u>
<b>SubTotal</b>	<b>3,776</b>	<b>755</b>	<b>1,133</b>	<b>283</b>

### Olaya

Olaya	500	100	150	38
El Vijal	200	40	60	15
Guadualita	100	20	30	8
La Barca	120	24	36	9
Los Cajones	50	10	15	4
La Lomita	60	12	18	5
El Credo	150	30	45	11
<u>Papayal</u>	<u>300</u>	<u>60</u>	<u>90</u>	<u>23</u>
<b>SubTotal</b>	<b>1,480</b>	<b>296</b>	<b>444</b>	<b>111</b>

### El Tambo

El Tablon	350	70	105	26
Guayabal	200	40	60	15
Cabuyal	550	110	165	41
Quiulace	540	108	162	41
La Banda	500	100	150	38
Pueblo	250	50	75	19
Nuevo				
<u>La Mosquera</u>	<u>300</u>	<u>60</u>	<u>90</u>	<u>23</u>
<b>SubTotal</b>	<b>2,690</b>	<b>538</b>	<b>807</b>	<b>202</b>

### La Sierra

		0		
Tabloncito	200	40	60	15
Limoncito	300	60	90	23
La Depresion	150	30	45	11
Juana Castaña	350	70	105	26
Sachamates	194	39	58	15
Chorritos	200	40	60	15
El Guavito	100	20	30	8
Piedrasentada	700	140	210	53
Campo Bello	100	20	30	8
La Alianza	560	112	168	42
El Hoyo	400	80	120	30
<u>La</u>	<u>350</u>	<u>70</u>	<u>105</u>	<u>26</u>
<u>Esperanza</u>				
<b>SubTotal</b>	<b>3,604</b>	<b>721</b>	<b>1,081</b>	<b>270</b>

<b>Total</b>	<b>19,726</b>	<b>3,945</b>	<b>5,918</b>	<b>1,479</b>
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# Exhibit 6

<b>Nucleos</b>		<b>de Patia</b>		<b>Sumario</b>	
<b>Numero de</b>		<b>Numero de</b>	<b>Numero de</b>	<b>Total de</b>	<b>Hectares</b>
<b>Nucleo</b>	<b>Veredas</b>	<b>Poblacion</b>	<b>Familias</b>	<b>Hectares</b>	<b>de Ilicito</b>
Patia	14	3,886	777	1,166	291
El Tuno	8	2,590	518	777	194
Mercaderes	4	1,700	340	510	128
El Estrecho	8	3,776	755	1,133	283
Olaya	8	1,480	296	444	111
El Tambo	6	2,690	538	807	202
<u>La Sierra</u>	<u>12</u>	<u>3,604</u>	<u>721</u>	<u>1,081</u>	<u>270</u>
<b>Total</b>	<b>60</b>	<b>19,726</b>	<b>3,945</b>	<b>5,918</b>	<b>1,479</b>

# Exhibit 7

Año <u>Trimestre</u>	Nucleo			Ejemplar		Valle	de	Patia
	<u>1o</u>	<u>2o</u>	<u>3o</u>	<u>4o</u>	<u>1o</u>	<u>2o</u>	<u>3o</u>	<u>4o</u>
Irrigacion	-1000000	-1000000						
Frutales-Inversion			-300000		-300000		-300000	
Frutales-Ingresos				600000		600000		600000
Hotalizas-Inversion			-400000		-400000		-400000	
Hotalizas-Ingresos				600000		600000		600000
Maiz-Inversion			-125000		-125000		-125000	
Maiz-Ingresos				180000		180000		180000
Guandul-Inversion		-187000					12500	12500
Guandul-Ingresos					75000	90000	100000	100000
Ganado Lechera	-33750							
Ganado Lechera				15000	20000	22000	25000	27500
Apicultura-Inversion	-65000	-65000						
Apicultura-Ingresos			10000	20000	20000	20000	20000	20000
Totumo-Inversion	-5000							
Totumo-Ingresos								
Total	-1098750	-1252000	-815000	1415000	-710000	1512000	-667500	1540000
Total Aumulado	-1098750	-2350750	-3165750	-1750750	-2460750	-948750	-1616250	-76250

(000 Pesos )

<u>3o</u>				<u>4o</u>			
<u>1o</u>	<u>2o</u>	<u>3o</u>	<u>4o</u>	<u>1o</u>	<u>2o</u>	<u>3o</u>	<u>4o</u>
-300000		-300000		-300000		-300000	
	600000		600000		600000		600000
-400000		-400000		-400000		-400000	
	600000		600000		600000		600000
-125000		-125000		-125000		-125000	
	180000		180000		180000		180000
12500	12500	12500	12500	12500	12500	12500	12500
100000	100000	100000	100000	100000	100000	100000	100000
30000	33750	33750	33750	33750	33750	33750	33750
20000	20000	50000	50000	50000	50000	50000	50000
				5000	5000	5000	5000
-662500	1546250	-628750	1576250	-628750	1576250	-628750	1576250
-738750	807500	178750	1755000	1126250	2702500	2073750	3650000