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Comparisons of Production Costs and Profit of Three Different Technology Levels of Papaya Production in Tabasco, Mexico

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Abstract

The survey was carried out from September 2006 to January 2007 in three papaya production sites located in main papaya production zones in Tabasco; SE Mexico. There are differences in size of the cultivated area, in the yield of the papaya as well as in production costs and profit, according to the different technology levels in the farming systems: low, medium and high technology cultivation level. The financial evaluations were carried out in three sites with different productive technologies. The comparison of the agronomic and economic traits results for low technology level in: VAN of 2359.00 USD, BCR in 1.9 and an equilibrium point of 3750.00 USD, TIR of 0.25. In order to avoid loses, a quantity of 10714 kg papaya should be sold. In medium technology VAN is 1605.10 USD, BCR is 1.7, TIR 0.20 and the equilibrium point is 12800.00 USD. 36571 kg of papaya should be yearly sold. In high technology level VAN is 11749.40, BCR is 2.73, TIR 0.43 and the equilibrium point is 12187.50 USD, 34821 kg papaya should be sold yearly. The indicators showed that all three levels are profitable and economically viable.

Keywords: investment, yield, production costs, benefit - cost - ratio, equilibrium point

Resumen

La investigación se llevó a cabo en 3 unidades de producción de papaya ubicadas en las principales zonas agroecológicas productoras de papaya en el Estado de Tabasco entre Septiembre 2006 a Enero de 2007. Existen diferencias en el tamaño del área cultivada, en rendimientos de la papaya así como en costos de producción y rentabilidad, de acuerdo a las diferentes tecnologías utilizadas en las unidades de producción: alto, mediano y bajo nivel de tecnificación del proceso productivo). Las evaluaciones financieras fueron realizadas en tres unidades de producción ubicadas en Cunduacán, Teapa y Balancán. La comparación de los aspectos agronómicos y económicos resultó en tecnología baja: VAN es de USD 2359.20; RB/C es 1.9 y el punto de equilibrio es de USD 3750.00 y

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TIR es 0.25; para no tener pérdidas se debe vender 10714 kg de papaya. En tecnología media: VAN es de USD 1605.10; RB/C es 1.7, TIR 0.20 y el punto de equilibrio que es de USD 12800.00 y 36571 kg. En tecnología alta: VAN es de USD 11749.40; RB/C es 2.73, TIR 0.43 y el punto de equilibrio que es de USD 12187.50 y 34821 kg. Los indicadores demostraron que todos los niveles son rentables.

Palabras clave: inversión, rendimiento, costos de producción, beneficio-costo, punto de equilibrio.

1 Introduction

Mexico is immersed in a deep changing process. Thousands of big agro exporting enterprises are successful while an outstanding proportion of commercial producers are in bankrupt. Small farms are impoverished; however they do not disappear due to the lack of employment alternatives. It is necessary to rethink about the rural concept when the agricultures produce only for self consumption without the possibility to develop their market production subsisting on incomes gotten thanks to complex temporary migratory processes. It is imperative for Mexican farmers to become managers taking advantage on their experience and the needed implications for the organization of the production, education, training, product organization, commerce transformation, supplying of own personnel or use of technology (Pohlan *et al.*, 2007; Plata, 2000). In a great number of cases farmers in the tropics have the same social economical and financial problems, such as the lack of technology, substructure for the production and commercialization, training and technical assistance, organization to produce and commercialize in a proper way, productive chain articulation, subsidies and lack of strategies to develop human factor (Wander *et al.*, 2007; Méndez Garrido, 2005, p.9).

Nation wide, Tabasco occupied the eighth position of Mexican papaya producers with 662 ha, with a total production of 214,679 tons per year (SAGARPA, 2005). Tabasco has a humid tropical climate where the growth of papaya (*Carica papaya* L.) is propitiated. Papaya cultivating areas have increased between 1991 (187 ha) and 2001 (2126 ha) (SAGARPA, 2001). During the last years papaya production has reached a rise in sown land surface, the Maradol and Zapote varieties are the most commercialized species at the moment with yields of more than 27 t ha^{-1} which has sustained as a profitable product for the small farmers of the Centro and Chontalpa regions of Tabasco. For most producers the Maradol variety is sown in an 80% and the rest are the varieties Zapote and Tabasco 95. The main problem in fruit production is the presence of the fruit annular rotting caused by a virus (Mirafuentes Hernandez, 2001). Because of this, Tabasco is making an update of the producers' census list with the support of their districts and the integration of the product System State Council to organize producers on the getting, post-harvest handling and commercialization of this papaya fruit. The papaya production and commercialization is a challenge for each of the municipalities in the state, due to structural and fundamental problems starting with the handling of crops, the application of proper technology, infrastructure, training, technical assistance, meteorological phenomena, pests and diseases until the aggregated value chains and commercialization as well as the investment needed to get a greater income.

2 Methods and Materials

2.1 Study area

Tabasco is located in south east of Mexico; it extends from the Gulf of Mexico plain coast to the north of Chiapas' Sierra. Tabasco soils are mainly alluvial soils on flat and lowlands, excepting for the limiting zone with Chiapas which is mountainous. The climate is humid and hot distinguished by high temperatures quite uniform with an annual mean of 26° C. There are three important papaya producing sub regions, Chontalpa, Centro-Sierra and Los Rios, each one with different features. Most of the low technology farmers are found in the Chontalpa and Centro sub regions, mainly in the municipalities of Cunduacan, Huimanguillo and Cardenas, which represents the 88% of the total shown land among 1-5 ha. The medium technology farmer are found in Cunduacan, Huimanguillo and Teapa which represent 7.5 % of papaya area with plantations between 5 to 10 ha. The high technology farmers are located in Balancan representing only 4.5 % of the total, with plantations of more than 10 ha in size. According to the data of SAGARPA (2005), in Tabasco are 189 Maradol papaya temporary producers (610 ha) and 10 farmers with 33 ha irrigated papaya cropping. In Chontalpa the greatest number of low technology producers (175 farmer) is concentrated with surfaces between 1 to 2 hectares (manual and temporary crops), 24 medium technology producers in Chontalpa and Centro-Sierra. The high technology producers are located in Balancan, in Los Rios region where there is a small number of producers and great areas of high technologies (irrigation and mechanization) with sown areas between 10 and 40 ha. with a total of 199 producers (SAGARPA, 2006).

This study was carried out in six main papaya producing municipalities in Tabasco: Huimanguillo, Cardenas, Cunduacan, Centro, Teapa and Balancan (Figure 1).

By stratified sampling, 67 surveys were applied in these 6 municipalities. For the data analysis of the survey, the DYANE statistical software (SANTESMASES, 2005) was used. For the economical analysis we determined the yields obtained in the field, carrying out interviews with producers and own observation.
For each technology level (low, medium and high) we selected three production units to be studied in their handling of the product and their costs/profits ratios.

For the comparison between the different technology levels were analyzed the following economical indicators:

Net present value (VAN):
$VAN = -p + (F_1/(1+i)^1 + F_2/(1+I)^2 + F_3/(1+i)^3 + \cdots + F_n/(1+i)^n$

Benefit – cost – ratio (BCR):
$BCR = profit/total\ costs$

Point of equilibrium (PE):
$PE = fixed\ costs/(1 - variable\ costs/net\ sales)$;
$PE = TIR$ being $VAN = 0$

Discount rate (TIR):
TIR= by which the VAN is equal to zero, and it is defined as the I (its determined by rough calculation) that is made with the discounted flows being equal to the initial investment. Once the information was obtained, it was organized and systemized according to the fix and variable costs, determining the total papaya production costs in the three levels of technology to calculate the profitability product indicators at the price in January 2006. The aspects analyzed were the fixed costs and the production costs, in the papaya production process, during the first 12 months with a 5 year projection to obtain financial indicators: net present value (VAN), benefit/cost ratio (RB/C), TIR and point of equilibrium (PE).

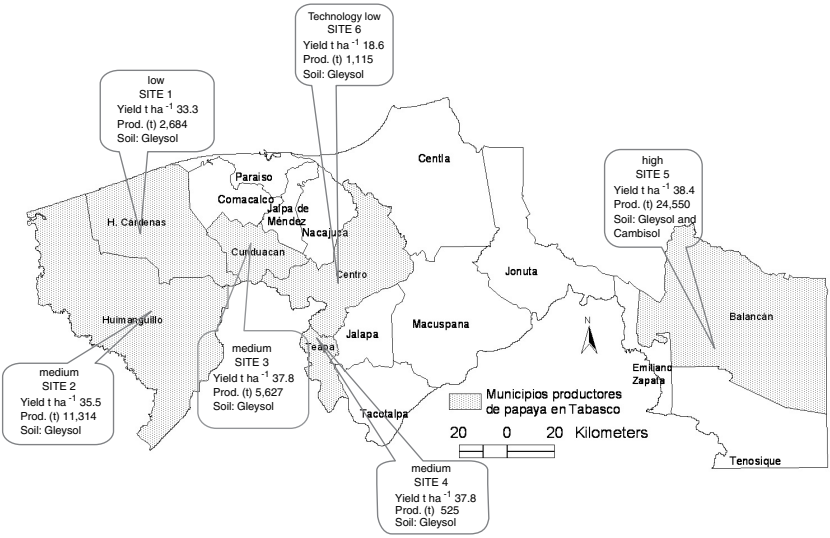
The VAN is defined as the result of the difference between the updated incomes (positive values) and updated costs (negative values) to a determinate discount rate (Coss Bu, 2001, p. 61). This discount rate allows making comparable the flow either incomes or costs. When the VAN is positive to a higher rate tax than 15% annual, it is considered that the project profitability is acceptable and thus financially convenient. Depreciation is the diminution of the price or value that suffers to a product as a consequence of the use and time. It is only applied to the fix actives; all the enterprises should base their calculations of their depreciations in the Financial Law (art. 37 of the LISR). This is calculated only for medium and high technology levels.

The different technological papaya production levels were determined by the main factors such as cultivation density, crop size, use of irrigation, use of agrochemicals, agro ecological handling, rank of crop significance, harvest method and post harvest handling (Table 1). The main elements to differentiate the level of technology were the cultivating system and the use of materials and agricultural implements such as tractors, irrigation system and transportation means.

Table 1: Papaya production technologies in Tabasco (classification based in SAGARPA (2005); Silva Torres (2002).

Concept	*Technology level*		
	Low	*Medium*	*High*
Crop density per ha	1100 plants	1600 plants	2200 plants
Size of plantation (ha)	1 to 4	5 to 10	10 or more
Use of irrigation	no	tubes or drops	drops or tubes
Use of agrochemicals	low	medium	high
Agro ecological handlings	low	low	low
Productive Structure (Rank of crop importance)	10% or less with papaya	30% of the area is papaya	more than 50% is papaya
Harvest method	manual	manual & with equipment	with equipment
Post Harvest handling	manual	medium technician	highly process technician

Figure 1: Sites of the papaya cultivation areas in Tabasco, Mexico.



3 Situation of the papaya cultivation in Tabasco

The papaya production in Tabasco is mainly characterized economically and socially of low production technology, for which is the main economical activity and its main familiar source of income for the producers by selling their produce in the local and national market by intermediaries. In contrast to them, the producers with medium and high technologies have a high income potential in the national and international markets due to the great demand of this fruit.

Based in the project carried out by Semillas del Caribe (2000), the production cost per hectare of Maradol papaya, under average conditions in Mexico, and considering a cycle of 18 months (2 months in nursery, 7 in crop growing and 9 in fructification and harvest) it was determined in a total of $105,548.50 Mexican pesos, (1 USD≈$10.00 Mexican pesos) with partial costs for tillage $3,190.00; $4,647.50 for the planting preparation, sowing $1,540.00; irrigation $3,400.00; weed control $3,100.00; pest management $24,987.00; fertilization $26,244.00; cultivating handling $9,940.00 and harvest $28,500.00 (Semillas del Caribe, 2000).

The price paid to the producer per kilogram of fruit in 1999 varied from $2.00 to $6.00 (0.20 USD to 0.60 USD), depending on the fruit quality, the season and the market to it was sent. In the year 2006 the price paid to the producer by the intermediary in Tabasco was the same as 6 years ago.

Silva Torres (2002) reported that the average income obtained by the small producers in a two year producing cycle is $181,260 pesos ha^{-1}, harvesting 95.4 t ha^{-1} with a price of 1.90 pesos ha^{-1} of fruit. In contrast, the medium producers have an average

income of \$529,332 pesos ha^{-1}, and the high technology producers have incomes of \$618,800 pesos ha^{-1} selling at 3.4 pesos ha^{-1} (Table 2).

Table 2: Comparison of production costs (Mexican pesos ha^{-1}) in a 2 year cycle in San Pedro, Balancan (Silva Torres, 2002).

Concept	*Small holding farmers*	*Medium size farmers*	*Big size farmers*
Land Acquisition	0	0	3750
Machinery and Equipments	6477	16179	50375
Land conditioning	2044	1368	4041
Nursery	5465	2565	1011
Transplanting	522	801	486
Irrigation	11435	4022	2231
Pest management	15315	31482	31131
Weed control	1258	3166	1697
Fertilization	6441	20139	34075
Cultivating labours	390	468	477
Harvest an post harvest	15743	19432	38549
Transport	0	64633	79762
Total costs	65090	164255	247585
Income ha^{-1}	181260	529332	618800
Profit ha^{-1}	116170	374581	371214

4 Results and Discussion

4.1 Agro ecological parameters in the different production sites

The Zapote Variety is only cultivated by the low technological level farmers. The Maradol variety is the most predominant in the high and medium levels. These farmers buy the plants in specialized nurseries. The harvest of Maradol starts at six months and the Zapote variety seven months after transplanting. The productive period varies between 5 and 7 months with harvest cuts in an 8 day rhythm. The harvest must be realized when the fruits present a maturation point of 25 to 35 % yellow to be sent to the local market. For external market the fruit should show a trace of yellow color. Both varieties present five productive months, considering that it shouldn't be affected by pests and diseases. In the medium and high level technologies farmers calculate 15 t per cut and hectare, which fills a truck with 9000 fruits with an average weight of 1.7 kg approximately.

The evaluation of the agro ecological features in the six producing units presented a very heterogeneous scenario among the producing units (Table 3). The cultivated density according to the technology level varies between 1000 and 2140 plants ha^{-1}.

Table 3: Agro ecological parameters in the different production sites.

Agro ecological parameters	*Cárdenas*	*Centro*	*Huimanguillo*	*Cunduacán*	*Teapa*	*Balancán*
Level of technology	low	low	medium	medium	medium	high
Density (plants per hectare)	1800	1000	1400	2000	2140	2140
Sown surface area (ha)	2	1	3	3.5 to 5	6	20 to 40
Water quality	low	medium	medium	medium	medium	high
Cropping System	temporary	temporal	temporary	irrigation	irrigation	irrigation
Use of agrochemicals	medium	low	medium	high	medium	high

Water quality was analyzed in each site. Irrigation systems only exist in medium and high production level units. The use of agrochemicals in reference to the interviews done is according to the technology level.

The economical aspects (Table 4, Figure 1) vary in the production units shown mainly by the technology level. The use of irrigation in the units of high and medium technology has an influence in the yield of these units. The economic incomes are higher in the high technology level. The production costs are significantly higher caused by machinery and equipment investment such as tractors and modern systems of fertirrigation, which allow a more precise application of fertilizers. The interviews showed average yields of 40 t ha^{-1} for the low technology level, 60 t ha^{-1} for the medium technology level and 80 t ha^{-1} for the high level. The production costs per hectare vary from \$25,000 to \$40,000; \$60,000 to \$80,000 and \$80,000 to \$100,000 Mexican pesos, respectively.

Table 4: Economical parameters of papaya crops in different municipalities of Tabasco.

Economical parameters	*Cárdenas*	*Centro*	*Huimanguillo*	*Cunduacán*	*Teapa*	*Balancán*
Type of Technology	low	low	medium	medium	medium	high
Cropping System	temporary	temporary	temporary	irrigation	irrigation	irrigation
Cultivated surface with papaya	10%	10%	$> 50\%$	30%	$> 50\%$	$> 50\%$
Post harvest	manual	manual	manual	manual	manual	manual
Yield (t* ha^{-1})	28	28	60	60	60	84
Production costs (Mex. pesos ha^{-1})	40,000	40,000	120,000	120,000	120,000	160,000

The low technology farmers represent 88% in Tabasco, according to the information obtained from the surveys and it was also confirmed that the average plant density that are sown in the low technology surfaces is of 1100 plants per hectare, 1600 in the medium technology lands and 2200 in the high technology surfaces (Table 5). Height of the plants, size of the stem and yield were strongly related to fertilization.

Table 5: Agro economical characteristics according to the applied technology.

Concept	*Technology level*		
	Low	*Medium*	*High*
Plant density per hectare	1100 plants	1600	2200
Size of the plantation (ha)	1 to 5	5 to 10	10 or more
Type of cropping system	Temporary	Irrigation	irrigation
Distance between plants (m)	3×3	3×2.5	2×2.5
Drainage	Low	Medium	high
Height of the plants (m)	1.87	1.94	2.05
Stem diameter (cm)	30	44	46
Harvest calendar	each 10 days	each 8 days	each 8 days
Harvest period	5 months	7 months	8 months or more
No. of harvest cuts/month	3 cuts	4 cuts	4 cuts
No. of harvest cuts/year	15	20	28
No. fruits/plant/cut	1 to 5	8 to 10	8 to 10
Average weight/fruit (kg)	2.5	2.00 to 3.00	2.00 to 3.00
Yield (t/ha)	28	60	84

4.2 Production costs

The concepts that build up the cost structure are variable and fix costs. The total cost is the sum of the total variable cost (CVT) and the total fixed cost (CFT) (Baca Urbina, 2006) (Table 6).

Table 6: Comparative costs in the different technological levels (Mexican pesos per ha).

Concept	*Technology level*		
	Low	*Medium*	*High*
Land preparation	3500	5000	5000
Tools and equipments	2260	44410	54490
Plants	1650	8000	11000
Sowing	2850	10500	13500
Irrigation	0	10000	20000
Fertilization	7325	7500	10220
Pests and disease control	24318	40863	44034
Weed control	0	3800	7200
Harvest	500	8925	9425
Total costs	42403	138998	174939

The finality of this feature is to determine the profitability for the producer comparing the costs and benefits considering all the incomes and expenses, the money relative value in time and interest rate. The differences among the levels of costs for the productive

cycle are influenced mainly by the acquisition of the plants (amount and variety) and the agrochemical materials (fertilizers, fungicides and herbicides). The raw material costs in the plantations with low technology level are 13193 pesos ha^{-1}, following by the medium level with 29101 and high level with 37369 pesos ha^{-1} (Table 7). It's important to say that the mentioned products are applied in a revolving way as preventions and in some cases of more incidences. The prices for the agrochemicals are base to the brokers of these products in March 2007.

Table 7: Raw material costs in the different technological levels (Mexican pesos per ha).

Concept	*Technology level*		
	Low	*Medium*	*High*
Plants	1650	10500	13600
Fertilizers	7325	7500	10620
Fungicides	3318	9051	11099
Herbicides	600	800	800
Paper for fruit packing	300	1250	1250
Total cost	13193	29101	37369

The variable costs are the only directly affecting production costs. In contrary, the total fixed fabrication costs remain constant at any production volume. The total variable costs increase in a direct proportion with the change that occurs in the production. Table 8 presents the variable and fixed costs for the papaya production.

Table 8: Total costs in the different technological levels (Mexican pesos/ha).

Concept	*Technology level*		
	Low	*Medium*	*High*
Variable costs	38133	59061	104829
Raw material	13193	29101	37369
Labor	24700	29600	63500
Water	240	360	360
Fuel	0	0	2400
Electricity	0	0	1200
Fix costs	18000	96000	78000
Rent	18000	18000	0
Administration	0	36000	36000
Sale costs (15 tons truck) $ 7000 x 6 months	0	42000	42000
Total costs	56133	155061	182829

The marginal contribution percentages characterizing the productivity level is 48% in the lower level, 72% in the medium and 59% in the high. Each peso per sale is designated to the fixed costs being of 52, 28 and 41% remaining, designated for the variable costs.

The security margin (SM) is the percentage in which the sales can be reduced before possible loses.

SM (low technology) = (70000-37500)/70000 = 0.46 ≅ 46%
SM (medium technology) = (210000-128000)/210000 = 0.39 ≅ 39%
SM (high technology) = (294000-121875)/2940000 = 0.58 ≅ 58%.

In the case of high technology, the security Margin of 58% indicates that the papaya sales could be reduced to 58 % without financial loss. The neutral point of the enterprise is 42% of the total sales volume. That is, if it is sold at a neutral point its security margin is zero.

Table 9: Marginal contribution of the different technological levels (Mexican pesos/ha).

Concept	*Technology level*		
	Low	*Medium*	*High*
Yield (t ha^{-1})	28	60	84
Price (Mexican pesos / kg)	2.50	3.50	3.50
Net sales	70000	210000	294000
Variable costs	38133	59061	104829
Marginal contributions	31867	150939	189171
Contribution percentage	48	72	59
Security margin (%)	46	39	58

4.3 Profitability of the different production levels

The initial investment varied from $44323.00 in low technology and $148670 in high technology. The cash flows for five years ranged from $84481.00 in medium technology to $406069.00 in high technology (Table 10).This was the case in the three levels that presented values from $16,051 in the medium level to $117,494 Mexican pesos in the high level (Table 10).

The relation profit/cost (BCR) ranged from 1.7 to 2.7 in the different technology is an positive economic income, and so production is profitable (Table 10).

Our study shows that there's a financial profitability in the three different production levels. Most of low producers are located in Chontalpa and Centro sub regions mainly in Cunduacan, Huimanguillo and Cardenas and represent 88.06% with 1-5 has cultivated. This temporary system presents 6 months from sow time (1100 plants 3.00×3.00m apart) to harvest and 5 or 6 of harvest as high average production. (1.85 per cut each 10 days are 3 cuts per month, total 15 cuts = 28 tons a year. Market price is 2.50 kg., and incomes per sales are $70,000.00, considering that disease and plague problems have a 50% influence. It's transplanted from June to August for the harvest between

Table 10: Investments effective flow and profitability indicators in the different technological levels (10 Mexican pesos = 1 USD).

Concept	*Technology level*		
	Low	*Medium*	*High*
Fix investment	2420	86630	103430
Deferred investment	1500	1500	1500
Labour capital	36483	40476	43740
Total investment	44323	1286806	148670
Effective flow	84481	219483	406069
VAN	23592	16051	117494
BCR	1.9	1.7	2.73
TIR	0.253773	0.200580	0.430864
Point of Equilibrium	Sales should be 37,500 Pesos to have no losses, therefore it must be sold a minimum of 10,714 kg at $2.50/kg	Sales should be 128,000 Pesos to have no losses, therefore it must be sold a minimum of 36,571 kg at $3.5/kg	Sales should be 121,875 Pesos to have no losses, therefore it must be sold a minimum of 34,821 kg at $3.5/kg

February and June taking into account that in cold seasons the papaya consumption lowers from December to January. The results give: VAN is 2359.20 USD, BCR is 1.9 and the equilibrium point is 3750.00 USD in order to avoid loses, it should be sold at 10714 kg ant TIR is 0.253773 and this indicators show that the system is profitable.

Most of medium technology producers cultivated papaya in Cunduacan, Huimaguillo and Teapa. This producers harvest each 8 days, 1 to 5 t ha^{-1} in an average of 3 t per cut and 4 cuts per month with a yield of 60 t ha^{-1}. In medium technology VAN is 1605.10 USD, BCR is 1.7, TIR 0.20 and the equilibrium point is 12800.60 USD and 36571 kg and indicators have shown that also this system is very profitable.

High technology producers grew their papaya in Balancan. These big producers sell directly their products in a price of $3.50 per kg. The transplanting time in risk conditions is March, April to harvest in September-February. It's a cut each 8 days with an average of 3t/ha during 7 months which is an average of 28 cuts per year with a yield of 84 t ha^{-1} (Table 10). In high technology level VAN is 11749.40 USD, BCR is 2.73, TIR 0.430869 and the equilibrium point is 12187.50 USD with a minimum commerce of 34821 kg. The indicators showed that all three levels are profitable and economically viable.

4.4 Pro-form results

The aim of the analysis of the results or the loses or benefits is to calculate the real net profit and net cash flow, which is the real benefit and it is obtained extracting the incomes from all the cost that happen during the cropping season (Table 11). In

México, it's paid in 2007 (Based in IRS) the 28% of taxes. It's called pro-farm because this means projecting (normally 5 years) the economic results the producer will have. We assume that the need of 5 year projection is necessary to have a good profit margin, as well as crop rotation.

Table 11: Pro-form results in different technological levels.

Variables	*Year*				
	1	*2*	*3*	*4*	*5*
Low level					
Yield (t ha^{-1})	28	28	28	28	28
Income (Mex pesos ha^{-1})	70000	77000	84700	93170	102487
Production costs (Cv+Cf)	56133	61746	67920	74713	82184
Net cash flow	13867	15254	16780	18457	20303
Medium level					
Yield (t ha^{-1})	60	60	60	60	60
Income (Mex pesos ha^{-1})	210000	231000	254100	276210	303831
Production costs (Cv+Cf)	155061	170567	187624	206386	227025
Profit before taxes	54939	60433	66476	69824	76806
Taxes 28%	15383	16921	18613	19551	21506
Profit after taxes	39556	43512	47863	50273	55300
Services 26%	10285	11313	12444	13071	14378
INFINAVIT 5% IMSS 19.75+1.255 ceasing and retiring and salaries 2007					
Profit after tax	29271	32199	35419	37202	40922
Profit after benefits	8894	8894	8894	8894	8894
Depreciation					
Net cash flow	38165	41093	44313	46096	49816
High level					
Yield (t ha^{-1})	84	84	84	84	84
Income (Mex pesos ha^{-1})	294000	323400	355740	391314	430445
Production costs (Cv+Cf)	104829	115311	126842	139526	153479
Profit before taxes	111171	122289	134518	147970	162766
Taxes 28%	31128	34241	37665	41432	45574
Profit after taxes	80043	88048	96853	106538	117192
Services 26%	20811	22892	25182	27700	30470
INFINAVIT 5% IMSS 19.75+1.255 ceasing and retiring and salaries 2007					
Profit after tax	59232	65156	71671	78838	86702
Profit after benefits	8894	8894	8894	8894	8894
Depreciation					
Net cash flow	68126	74050	80565	87732	95596

Papaya production is profitable based on economic indicators considering pros and cons of the troubles that the producers face in their crops. Therefore, it should be considered a systematic planning of the investment program. From the small producers point of view, from income and expenses control to training and technical assistance as well as having a soil analysis before sowing, a good production process control, good farming practices including a complete control of plagues and diseases so that the ecological equilibrium of the environmental ecosystem can be kept. With few investments, profitability can be achieved. If more productive and profitable systems are to be installed, it will be necessary to have more investment.

5 Outlooks

In the last years papaya production was drastically reduced nation wide especially in Tabasco. This is the result of the high level of disease and plagues indexes in the crops, reducing the prices of the fruit, increasing the costs of materials and the low level of technology that makes a low profit in the papaya production in Tabasco. The application of low technology is profitable for the producers who crop 1-4 ha, even considering the pest and diseases problems and dryness and water flooding. Their incomes can be raised by adequate training and the use of good culture practices with an adapted technological level which allows them to produce with higher yield and better quality more profit. It's possible to organize sustainable growing, harvest and commercializing structures based in best culture practices, transparent fruit handling and high income for all papaya producers in Tabasco.

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