



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

17080-E

-1-

STUDY OF
A WINE PRODUCTION UNIT
IN THAILAND

::::::::::

CONTRACT N°88-26

SEPTEMBER 1988

::::::::::

Authors : CLAUDE B E N I G N I

and

MICHEL DE G U E R R Y

17

CONSULTANTS OF WORLDWIDE VINEYARDS

UNDER THE CARE OF "LES PEPINIÈRES ROGER MACLET"

C O N T E N T S

	PAGE
INTRODUCTION	4
THE WINE MARKET IN THAILAND	5
THE MARKET : MAIN DATA	5
EVALUATION OF CONSUMPTION	5
MAIN SUPPLIERS OF WINE IN THAILAND	6
PRODUCTS OFFERED	7
DISTRIBUTION CHAINS	8
THE MARKET : ATTEMPT AT ANALYSIS	9
A MARKET STILL CONFIDENTIAL	9
TASTES AND ATTITUDES OF SIAMESE CONSUMERS	9
OBSTACLES TO THE DEVELOPMENT OF THE MARKET	10
FACTORS FAVORING THE DEVELOPMENT	10
MODEL EXPLAINING THE DEVELOPMENT OF THE MARKET	11
IN THE NEW CONSUMING COUNTRIES	11
APPLICATION TO THE SIAMESE MARKET	12
VITICULTURE IN THAILAND	13
CLIMATE	14
TEMPERATURES	14
PRECIPITATIONS	14
SOILS	15
ANALYTICAL ASPECT	15
DRAINAGE	17
VINE-PLANTS	17
WHITE MALAGA	17
CARDINAL	17
MUSCAT OF HAMBURG	18
NEW VINE-PLANTS - NEW VITICULTURE	18
STOCKS	18
PROPAGATION METHODS	18
PLANTING AND CULTURAL PRATICES	19
ENVIRONMENTAL FACTORS	19
PLANTING METHODS	19
PLANTING AND HUSBANDRY	20
CULTURAL PRACTICES	20
YIELDS	21
PRODUCTION COSTS	22
PRICE AND PURCHASE METHOD FOR GRAPES	23
RESEARCH AND EXPERIMENTATION	23
GENERAL RECOMMENDATIONS	23
ADAPTATION TO THE PRESENT VITICULTURE	23
OF THE CENTRAL REGION	
THE FIGHT AGAINST THE INFECTIOUS DECLINE OF	24
THE VINEYARD	
REDUCING THE PRODUCTION COSTS : HYBRID	24
VINE-PLANTS	
CHOOSING THE DATE OF THE HARVEST	24
CONSIDERING THE DEVELOPMENT IN THE CENTRAL	25

REGION	
SELECTION OF THE VINE-PLANTS	25
DESIGNING ANOTHER VITICULTURE	26
ANALYSIS OF THE PROJECT	27
DEVELOPMENT OF THE PROJECT	27
THE INITIAL PROJECT	27
THE PROJECT AT THE END OF MAY 1988	27
A PREREQUISITE : THE DEFINITION OF THE QUALITY	28
TRADITIONAL CONCEPTION OF THE QUALITY	28
INDUSTRIAL CONCEPTION OF THE QUALITY	28
FEASIBILITY OF THE PROJECT	28
WHAT IS NOT POSSIBLE	28
WHAT IS POSSIBLE	28
MARKETING OF THE PROJECT	29
DEFINITION OF THE PRODUCTS	29
POSITIONING	29
PRICES	29
DISTRIBUTION	29
COMMUNICATION	30
COMPETITION	30
PROFITABILITY OF THE PROJECT	30
CALCULATION OF THE PRICE OF THE PRODUCT	31
MARGINS	31
THE OENOLOGICAL CHAIN	32
ANALYSIS OF THE PRESENT PRODUCTION	32
CONCLUSION AS REGARDS THE PRESENT PRODUCTION	34
DEFINITION OF THE TECHNIQUES OF PRODUCTION	35
PROJECT SCHEDULE	37
TECHNICAL STUDY AND MARKETING OF THE PRODUCT	37
LAUNCHING	37
GROWTH STAGE	38
RECOMMENDATIONS	38
ADAPTATION OF REGULATION	38
SHORT TERM STRATEGY	38
MEDIUM TERM STRATEGY	39
PROPOSITION FOR A TECHNICAL AND COMMERCIAL COOPERATION	39
VITICULTURAL COOPERATION	39
COOPERATION FOR THE PRODUCTION OF WINE	40
GENERAL CONCLUSION	42
REGARDING THE JOINT VENTURE PROJECT	
REGARDING THE TECHNICAL FEASIBILITY OF THE PROJECT	

ONUDI offers to analyse a project which can be summarized as follows :

The promoter of the project is a distillation plant which grows grapes for the production of brandy. This company is looking for a partner holding 49 % of the capital and able to supply it with grapes appropriate for the production of white and rosé wines as well as its know-how for the local production of wines of quality which are at present supplied by foreign countries.

Using as a basis an analysis of the wine market and its development, the observation of the situation of viticulture, taking into consideration the operators' will at every stage, we have tried to give a logical and relevant answer to the question asked, stressing the technical and economic aspect.

If unavoidable realities exist - as, for instance, the essential climatic factor -, which give a solid basis to the reasoning, numerous unknown economic and technological parameters remain : we are faced with an incipient market and viticulture and we do not know their future reality. From the data collected, our experts' role consists in making up reasonable hypotheses, leading to conclusions that we hope to be reasonable as well.

Of course, as it is only a question of opinions, our forecasts will be possibly confirmed or denied in the future by the facts ; we only hope that our study can be used as a basis of reflexion for operators of the sector, even if they criticize it when applying their own strategy.

The conclusions of this study can disappoint in some ways : in fact, we can but say, that on a short term, the potential of creation of wines of quality is limited. However, the policy of experimentation in progress can open new perspectives on a medium term.

The presentation structure chosen for this report is conventional : starting from the analysis of the wine market in Thailand, determining what are the segments of the market which can be dealt with, the local viticulture is then studied. In fact, it is the crossing of the market opportunities with the technological constraints which allows to focus on the possible actions, to analyse the project presented and to lead to some ideas that we hope to be constructive.

THE WINE MARKET IN THAILAND :
PRESENT SITUATION AND DEVELOPMENT

Thailand is an example of the new consuming countries . It would be more correct to speak of a potential consuming country. In fact, we will see that the consumption is extremely low, more than two thousand times less important, for instance, than the French consumption per inhabitant.

However, great potentialities exist as it is shown by the drive of the operators, importers, distributors and...local producers.

It is essential to try to outline the components of this market, the forces which operate it, in order to determine the possible place and availabilities of a strategy of local production.

THE MARKET : MAIN DATA

In this chapter, our analysis is essentially backed up by the more recent study (May 88) concerning the wine market and carried out by the Department of Economic Development of the French Embassy. The other sources of information have been the interviews of the local professionals and the specialized reviews.

EVALUATION OF THE LOCAL CONSUMPTION

The evaluation of the consumption in Thailand must take into consideration the duty free sales which represent between 50 and 100 % of the taxed ones.

The taxed consumption represented 810,000 liters in 1986, the local production share being 20 % of this total. The consumption is thus very modest : less than 0,02 liter per inhabitant per year, i.e. 500 times less than in the U.S.A. and 200 times less than in Japan.

However, the consumption is steadily increasing : it is forecast by the professionals that the level of 1,000,000 liters will be reached by 1988 and the same think that the yearly growth rate will be higher than 6% for a long period. The following table shows the main trend over a recent period :

TABLE I
Imports, local production and valuated consumption from 1986 to 1988

YEAR	1986	1987*	1988**
IMPORTS	650,000	750,000	800,000
LOCAL PRODUCTION (in liters)	160,000	180,000	200,000
VALUATED TAXED CONSUMPTION	810,000	930,000	1,000,000

* valuation

** forecast

Table 2 shows the development of imports between 1982 and 1988 which have almost doubled since 1982 despite a decrease in 1984 and the establishment of high taxes on imports from 1985. As the local production has also increased over this period, it can be reasonably thought that the consumption has doubled over the said period.

TABLE 2
Development of the taxed imports from 1982 to 1987

YEAR	1982	1983	1984	1985	1986	1987	1988*
IMPORTS (in liters)	409	585	533	537	650	750	800
DEVELOPMENT (100 in 1982)	100	143	130	131	160	188	196

* forecast

As we have already mentioned it, the untaxed consumption is relatively important (between 500,000 and 1,000,000 liters).

For instance, in 1987, France exported 800,000 liters, its share in the taxed consumption being less than 400,000 liters, the French sales in the duty free network have been as substantial as the exports liable to duties. These sales would be as follows :

- 300,000 liters for THAI airline
- 100,000 liters for the diplomatic circles and the international organizations

As the other commercial partners of Thailand must also use the duty free outlet as the French companies do, the duty free consumption can reasonably be valuated at much more than 500,000 liters per year.

MAIN WINE SUPPLIERS IN THAILAND

All the major production regions of the world are competing on the market. Europe, the United States and Australia are on equal terms on this market, as their costs are almost similar. However, the countries which sell the wine in bulk (Chile, Bulgaria, ...) are not present on the market since that form of trade is not authorized.

In fact, there is a specialization between the supplying countries as France supplies especially the highest quality, Australia and Portugal being more oriented towards lower qualities.

As an example, here are the average prices (CIF value) of a bottle in 1987 :

FRANCE	60 BAHT
WEST GERMANY	58 "
SPAIN	48 "
ITALY	43 "
U.S.A.	36 "
PORTUGAL	30 "
AUSTRALIA	21 "

Table 3 gives an idea of the respective share of the market of the supplying countries. It must be noticed that French wine represents 60 % of imports while all other countries are below 10 %.

TABLE 3
Major countries supplying wine in Thailand

YEAR	1986				1987 (9 months)				
	COUNTRY	Volume	%	Value	%	Volume	%	Value	%
	FRANCE	296,269	45.30	26.4	62.48	258,218	44.85	20.66	59.29
	PORTUGAL	103,154	15.77	4.8	11.33	67,111	11.65	2.7	7.84
	AUSTRALIA	95,496	14.60	2.8	6.60	111,950	19.44	3.1	8.98
	ITALY	55,728	8.52	2.6	6.05	51,202	8.89	2.9	8.38
	U.S.A.	61,955	9.47	3.1	7.37	52,042	9.03	2.5	7.26
	WEST GERM.	14,956	2.28	1.1	2.59	20,015	3.47	1.5	4.45
	SPAIN	10,286	1.57	0.5	1.26	9,717	1.69	0.6	1.67
	TOTAL	653,881		42.2		575,730		34.7	
	SHARE OF THE 7 COUNTRIES		97.51		97.66		99.02		97.87

Volumes in liters
Value in million of baht

PRODUCTS OFFERED

The wines offered by the distributors and caterers in Thailand are numerous and very different in quality and price.

The big hotels have impressive cartes which can list up to 100 different wines (Regent Hotel or Shangri-la in Bangkok, for instance) ranging from 400 Baht to 5,000 baht and more. The great majority of wines are French and it is the case of all the highest quality ones.

In less prestigious restaurants, the range is limited and the price more modest. In an average restaurant, for example, it has been noted a carte with 7 wines (5 red and 2 rosé) comprising :

- 4 French red wines of baht 310 to 360
- 1 Italian red wine of baht 310
- 2 Portuguese rosé wines of baht 260

The ranges of wines offered by retail shops vary according to their standard and type (small shop, supermarket). Anyhow, the number of references offered is lower than in the luxury restaurants. The origins are various and the price brackets currently noticed according to the said origin (in 1988) are as follows :

- FRANCE	145-575 BAHT
- ITALY	159-199 "
- SPAIN	179-209 "
- U.S.A.	137-319 "
- PORTUGAL	139-164 "
- WEST GERMANY	145-225 "

The percentage of the Thai wines is low. The local production was valued at 160,000 liters in 1986, representing 20 % of the taxed consumption.

Having been started in 1974, the production of Thai wine has been supervised by the company United Products which has successively launched several Thai products which have progressively constituted a line up to the recent launching of the product "white and rosé Masala". The prices quoted are about 30 to 50 baht for a bottle of 0,3125 l and 90 baht for a bottle of 0,625 l (for "Masala"). Therefore, a gap can be observed between the price of the local wines and of the less expensive imported ones.

The Thai wines which, up to now, were only present in the retail distribution, begin to be offered in the restaurants and coffee shops (not in luxury restaurants).

DISTRIBUTION CHAINS

The retail distribution of the imported wines is supposed to be as follows :

- Hotels	50 %
- Restaurants	40 %
- Retail distribution	10 %

The importers-distributors act as wholesalers and warehousing companies, the latter function being essential under such climate.

In some distribution networks the chain is complete as they are present from import up to retail distribution.

More than 20 wine importers-distributors exist in Thailand which seems significant compared to the low quantities commercialized. In fact, for the majority of these companies, the wine trade is a marginal activity. However, the interest shown in the product by these companies shows that they are expecting a boom of the market in the future, opinion shared by the majority of professionals.

THE MARKET : ATTEMPT AT ANALYSIS

A MARKET STILL CONFIDENTIAL

The wine market in Thailand is a developing one which is largely "confidential" for the moment. Only a small segment of the population are wine consumers. The total consumption of Thailand corresponds only to the consumption of about 10,000 French people.

There is no tradition of wine consumption in Thailand. For a long time, this consumption has been - and still is - characteristic of a small minority composed of the well off cultured categories, the diplomatic staff and the jet society. On the other hand, the fact that hotels and restaurants represent 90 % of the distribution of imported wines lead to think that business and leisure tourism represents the main part of the consumption.

The relative democratization over the recent years could be due to tourism and especially to the American soldiers on leave during the Vietnam war. These soldiers would have brought with them the famous "rosé Mateus", a Portuguese wine slightly sweet and gassy. Since then, this wine has been widely ordered in hotels, restaurants and supermarkets and it remains the best sold trade mark. We will consider again this product later on since the development of the wine market can be clearly understood by using it as an example.

TASTES AND ATTITUDES OF THE CONSUMERS IN THAILAND

Globally, consumers can be divided into two segments :

- The "confirmed" ones who belong to the upper class of the population. They have been introduced to wine through their travels, meals western style and books. Their income allow them to buy expensive wines. They prefer classical wines, i.e. Burgundy or claret.

- The "beginners" who belong to the upper and middle classes. Rather young, they try wine through curiosity. They like better sweeter and flavory wines, not too expensive and more especially the "Mateus" and "Blue Nun" type.

The opportunities for consumption are exceptional : meals at the restaurant or dinners at home. Sometimes, wine is also offered as a gift .

OBSTACLES TO THE DEVELOPMENT OF THE MARKET

The obstacles to the development of wine consumption in Thailand are numerous :

- The religious obstacles exist only for the Muslim minority : in fact, alcoholic beverages are strictly forbidden by Islam

- The cultural obstacle : there is no wine tradition in Thailand. More especially, it is not the custom to serve wine during a meal ; moreover, the Thai cooking which is spiced or sweet sets a problem as regards the harmonization with the wine. Whisky or Cognac are more easily chosen to create and complete the warm atmosphere of a friendly meeting.

- The economic obstacle : obviously, together with the cultural factor, it is the essential one. It is related, on the one hand, to the low level of income, and on the other hand to the high cost of the product : a bottle of local wine costs more than a worker's daily salary.

- The obstacle linked to the size of the market and the absence of concentration of the sector : numerous firms are competing on a very reduced market with a lot of products and the commercial margins of the importers-distributors are very limited which do not allow significant promotion and advertising budgets. It is really a handicap on a market which reacts strongly to advertising and promotion strategies at the point of sale.

FACTORS FAVORING DEVELOPMENT

- Cultural factors : the Thai civilization and its openmindedness, friendliness, hedonism and refinement is, on a long term, a positive factor of development. In the wine civilization, Siamese people can find out elements similar to their own culture. Other positive factors are the natural curiosity of the Siamese people and their inclination to trying .

- Factors linked to the internationalization of alimentary behaviours : the process of alimentary acculturation which has always existed is now in full acceleration, making the main foodstuffs universal . Asia has given tea and spices to the Western world which, in turn gives it its wine. This "acculturation" is further speeded up by the rapid development of the intercontinental travels. Staying in Europe or in America, the tourists have the opportunity to discover the wine through gastronomy and wine tourism.

- The economic factor : the steady growth of the Thai economy leads to a progressive increase in the income and the gradual constitution of a middle class of engineers, executives and civil servants who will have a growing interest in wine and will be able to buy it. It is this class in formation which at a medium term will count many members and will be the promoter of the wine consumption.

**A MODEL EXPLAINING THE DEVELOPMENT OF THE MARKET
IN THE NEW CONSUMING COUNTRIES**

The experience of the growers and distributors who, in the sixties, tried to develop the wine market in the U.S.A., have led them to propose an empirical model explaining the development of the wine consumption in the countries with a low level of consumption.

The basis of reflexion is the existence, in such countries, of a growing young middle-upper class with an income allowing them to buy non indispensable products. It is this population that must be caught for the wine market.

However, this population's taste is strongly modelled by the consumption of "soft drinks" which are beverages :

- with a young and modern image
- flavored, sweet and tizzy.

As the classical wine had a rather severe image and taste - being even repulsive for beginners - intermediary beverages had to be invented to create a "bridge" between soft drinks and wine. That is why were launched in the sixties the pop wines, which were flavored with fruit and are the ancestors of the wine coolers and in the seventies of the great number of wines which adopted an image intermediary between the soft drink and the traditional wine.

What these products have in common with the soft drinks are their sweetness, their fizziness, the fact they can be drunk cool and their moderate cost. With classical wines, they have the alcoholic content (10 to 12%) and the labelling of the bottle. They are well known and appreciated world wide, the most famous being the Italian "Lambrusco", the German "Blue Nun" and the Portuguese "Mateus".

Part of the consumers of these wines for beginners continue their experience and get progressively initiated to the more complex tastes of the highest quality wines. Such development is clearly noticeable in the United States as well as in Japan.

APPLICATION TO THE MARKET IN THAILAND

Wine professionals in Thailand admit that the scheme mentioned applies to their own country as well, taking into consideration, of course, local particular aspects.

Therefore, they think that intermediary products, such as wine coolers, are necessary to have the Siamese people switch from soft drinks to wine. Besides, the initiatory role of wines such as "Mateus" or "Blue Nun" is obstructed by their disincentive price. This part is thus played by "Thai wines", such as the latest type launched, the "Masala". Thai wines are interesting because of their reasonable price compared to imported wines. For the development of the market, the ideal would be to obtain the quality of the "Mateus" at the price of the "Masala" or at a slightly higher cost.

Table 5 shows the ranking of the products on the price scale and it can be observed that no wine is offered within the bracket 90-135 baht. Opportunities for launching products exist certainly for this bracket on the double condition that :

- A better quality than the local products offered at present must be obtained ;
- The quality must not be too different from that of the less expensive imported wines which are the references of the market.

TABLE 5
Scale of prices for soft drinks, wine coolers and wines distributed

CATEGORY OF BEVERAGES	PRICE BRACKET	DESCRIPTION OF PRODUCTS
Soft drinks and beverages with a low alcoholic content	5-10 bahts	Soft drinks
	10-20 "	Wine coolers, beers
Local wines	25-45 "	Local wines (0.3125 l)
	50-90 "	Local wines (0.6250 l)
	90-135 "	NO PRODUCT OFFERED
Imported wines	135-200 "	Popular wines (0.70 l)
	200-600 "	Quality imported wines

VITICULTURE IN THAILAND

MAIN DATA

It is thought that the introduction of vines in Thailand is relatively old, but it is only in the fifties that a new expansion started with the arrival of new vine-plants coming from California and Spain.

At present, about 5,200 hectares (about 13,000 acres) of vineyards exist, producing 64,000,000 kg of grapes per year.

They are mainly grape varieties, such as the "white Malaga" which has the leading place (95 %) far before the "Cardinal" (5 %). Can also be noticed the presence of the "Muscat of Hamburg" which seems to be in a position to obtain a good ranking because of its specific qualities and especially because of its muscatel taste.

The national fruit market is the main outlet for this production (about 60,000,000 kg), 4,000,000 kg being then used for the production of brandy. The exports of grapes and the production of wine represent small quantities (220,000 kg for exports).

Among the main characteristics of the Siamese viticulture can be mentioned :

- Its location near Bangkok, major centre of consumption, in a geographical area situated west from the capital and less than 100 km from it, approximately in the square formed by the cities of DAMNOEN-SADUAK, SAMUT-SAKHON, NAKHON-CHAI SI, BANG-PHAEU.

We are in one of the "gardens" of Thailand in which the horticultural, fruit and market-garden productions, in the low and humid plain near the sea (Gulf of Thailand), are prevailing.

- The warm and humid tropical climate of the area situated between the 13th and the 14th parallel allows the vine to thrive and to be productive all year through with vegetative staggerings of the different vineyards ; that is why fresh grapes can be found on the markets all year long. An average of 4 to 5 harvests can be considered over a two-year period which implies the high yearly yield resulting from the gross figures mentioned below.

- The land is divided into small farms (2.5 to 5 hectares = about 6 to 12.5 acres) with a maximum of 10 hectares (25 acres) in which mecanization is very little developed because of the low cost of labour (the daily cost of a worker is 40-50 baht) and the difficulty of use of heavy agricultural equipment due to the humidity of the soils and the dense network of canals and drainage gaps.

- The costs of production are high and especially those relating to plant protection. In fact, the climate and the continuity of the vegetative activity make necessary a permanent control of the vineyard diseases and pests.

CLIMATE

The wine-growing region located in the area defined above has a tropical climate, warm, humid and subject to monsoon.

TEMPERATURES

We have the average minimum and maximum monthly temperatures for Bangkok and Kamphaeng-San which is located 60 km North from Damnoen-Saduak.

- The months of November to January are the less warm period with minimum temperatures between 17°C and 22°C and maximum about 31°C.

- April is the warmest month of the year with maximum temperatures about 35-37°C.

- The amplitude between maximum and minimum temperatures reach regularly 10-13°C.

PRECIPITATIONS

Monthly precipitations recorded in KAMPHAENG-SAN and RATCHA-BURI (20 km North West from DAMNOEN-SADUAK) (in millimeters)

TABLE 6
Monthly precipitations recorded in KAMPHAENG-SAN and RATCHA-BURI

MONTH	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY
KAMP.	6	11	36	73	162	112	123
RATCHA	5	10	8	29	145	122	121
	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER		TOTAL
KAMP	146	300	215	59	90		1233
RATCHA	158	217	218	20	7		1120

In Bangkok, the rain fall is :

- 194 mm from November to April

- 1,349.9 mm from May to October (543 mm from August to October)

Therefore, the total represents 1,543.9 mm.

The monsoon system entails a dry season from November to April and a humid one from May to October with maximum precipitations during the quarter August-September-October. The total of the yearly precipitations is not considerable in absolute value.

ATMOSPHERIC HUMIDITY

Regarding viticulture, this factor is capital. Unfortunately, we have not obtained any hygrometric reading for the region concerned. However, it is known that the air hygrometric degree is very high all year long.

CONCLUSION

The climate, which is permanently warm and humid, entailing a continuous growth of the vine, is very different from that of the latitudes in which are usually found vineyards for the production of wine. It has considerable phenological and health consequences. For this latter point, it can be said that the environmental conditions are hostile.

SOILS

ANALYTICAL ASPECT

Various results of soil analyses have been given to us by the Research Institute for Horticulture of Bangkok.

TABLE 7

Soil analyses

Nº of sample	1	2	3
Origin	Samut-Sakhon	Nakhon-P.	Katchaburi
Status	clay	humic clay	clay
pH	4.8	5.5	6.0
Organic content	2.13 %	4.40 %	2.34 %
Phosphorus ppm	369	672.5	392.5
Potassium ppm	470	3,600	602
Magnesium me/1,000 g of soil	2.6	3.65	2.15
Total exchange capacity me/100 g of soil	6.52	13.8	8.72

Another analysis has been carried out on a soil sample of DAMNOEN-SADUAK (silty clay loam with neutral response and no limestone).

TABLE 8

Soil physical analysis (vineyard of Damnoen-Saduak)

Elements	Quantity per 1,000
Rough sand	236
Sand	73
Rough loam	140
Loam	298
Clay	239
Total and active limestone	0
PH : water	7.0
PH :Kcl	6.3

TABLE 9

Soil chemical analysis (vineyard of Damnoen-Saduak)

Carbon 0/00	8.3	
Total organic content 0/00	14	poor
Total nitrogen 0/00	0.6	poor
C/N	13	high
Joret Hebert phosphate mg/kg	215	rich
Exchangeable bases :		
calcium		saturated
magnesium	10.9	
potassium	14.0	
sodium	0.4	
MGU	220 mg/kg	low
potash	660 mg/kg	rich
Total exchange capacity	100 mg	

The sample n°2 corresponds to a very rich soil especially as regards its organic content.

The samples n°1, 2 and 3 have a clear acidic response. Below pH =5 , the wine-grower must be cautious without considering it to be a limiting factor.

The soil analyses the results of which we have reproduced above are only indicative or documentary.

The only conclusion we can draw from them is that the soils considered do not seem unfavourable to viticulture from the physical and chemical point of view.

Up to now, we have no figures as regards the trace element content of the soil.

DRAINAGE

In Damnoen-Saduak, the vineyard has been planted in a plain saturated with water the soils of which are furthermore black asphyxiating silty clay loams. It has appeared necessary to the wine-growers to build a very dense network of drainage gaps and canals which will be examined later on and the importance of which expresses the difficulty existing when trying to reclaim lands. During our visit to one of the vineyards of DAMNOEN-SADUAK, the water in the canals was 60 to 80 cm below the level of the top soil whereas the dry season had just ended.

In the region of KAMPHAENG-SANG, soils are lighter and sandy; they dry more easily, facilitating considerably the drainage works. As vine is not particularly resistant to water excess and root asphyxy, it can be thought that this region is more favourable for this specific point. Furthermore, the mechanization of the work can be developed quicker because, for example, of the easy moving of the machines when no canal hampers their operating in the lots. (Such operating is impossible in the vineyard visited in DAMNOEN-SADUAK).

VINE-PLANTS

WHITE MALAGA

It is the most widespread and best known by the wine-growers of the region (see above). It produces a white grape with long bunches, round or long grapes according to the origins. Its thick skin confers on it an appreciable resistance as regards climatic agents and current diseases.

It is supposed to produce 10 to 15 kg per plant and per harvest, with 2 harvests a year.

CARDINAL

This grape with its large conical bunches, its spherical dark red purplish grapes, interests the wine-growers because especially of its short cycle (3.5 months between pruning and harvest) which allows 5 harvests over a two-year period, with a yield of 10 to 15 kg per stump and harvest.

Risks of bursting of the grapes and therefore of grey mould rot (*Botrytis cinerea*) when rains fall on the eve of the harvest must be noted.

Cardinal is supposed to be sensitive to downy mildew (*Plasmopara viticola*), powdery mildew (*Uncinula necator*), excoriosis (*Phoma reniformis*) and court-noue (infectious degeneration).

Despite the unfavourable conditions, it thrives and it can be thought that more resistant vine-plants not yet introduced should be at least as satisfactory from the plant health point of view.

MUSCAT OF HAMBURG

It is also to be consumed as a fruit. Its grapes are black and its taste finely muscatel is generally most appreciated. Beautifully conically shaped, the bunches add to the charm of this variety.

When incorporated in the wine, it gives a typical taste linked to its muscatel savour.

This variety is very sensitive to downy and powdery mildew. On the other hand, it is vigorous and its cycle is of medium length.

NEW VINE-PLANTS. NEW VITICULTURE

We have just mentioned the varieties which are cultivated at present on the Siamese wine soil of the central region.

We observe that there are varieties initially designed to be consumed as fruit and not to be used in vats. However, they are not a priori satisfactorily adapted to the climatic domain. Consequently, for the production of wine, new varieties must be considered. Besides, the Siamese researchers are working on this topic as we will see later on.

STOCKS

We should say the stock as, to the best of our knowledge, a one only stock is extensively used : a Othello x Solonis 1613 crossing.

Grafting is essentially used in the North Western part of the wine-growing region (SAMPHRANG-SAN) whilst ungrafted plants are more frequent in the DAMNOEN-SADUAK area.

Locally, it is agreed that grafted wines have better yields and a better resistance to coulure than ungrafted ones. On the other hand, it is thought that the grapes produced by the latter have a better quality (they are sweeter).

PROPAGATION METHODS

We have been explained by the wine-growers of DAMNOEN-SADUAK that layering was often used by them.

Cuttings are also used for the production of ungrafted vines.

The grafting on Othello x Solonis 1613 seems especially used when an improvement or a regularization of the yields is required for the reasons mentioned in the previous paragraph.

PLANTING METHODS AND HUSBANDRY

The promoter of the project to whom we had asked to make us visit a representative vineyard within the framework of our study, took us to an estate in DAMNOEN-SADUAK which we visited accompanied by him, the farmer and the intermediary who collects and resells the grape.

ENVIRONMENTAL CONDITIONS

Deep clay soils. Warm and humid climate. Superficial ground water with risks of soil flooding. We have been specified that no coming up of sodium chloride is to be feared.

The rural environment is organized within a dense fabric of canals which is an essential means of communication and of transport of the harvests. Besides, the floating market of DAMNOEN-SADUAK is famous. This network of canals spreads up to the very plots of vineyards they serve and drain.

PLANTING METHODS

When a vine-plant is replacing an old one, the old plants are summarily uprooted, roots and rootlets grow on the spot without any extirpation and 1 or 2 years after the uprooting a new planting takes place without any disinfection of the soil.

- Preparation of the soil : it is carried out during the dry season and consists of plowing followed by the modelling of lands 3 meters wide separated by ditches 3 meters wide and more than 1 meter deep.

The ditches are strictly parallel and on both sides of the field open onto a canal surrounding the plot.

Plowing can be made by tractors when ditches are essentially dug manually. Vineyards are inspected on foot, passing canals and ditches thanks to bridges or boards, or by crafts used especially to transport the harvest.

We have been specified that the soils do not receive any basic fertilization before planting.

- Date of planting : August-September according to the wine-grower of DAMNOEN-SADUAK, and June according to the Institute of Horticulture of Bangkok.

- Density of planting : about 120 plants per rai (6.25 rai per hectare), i.e. 750 plants per hectare, each land being planted with two rows separated by 2 meters. On each row, stumps are planted every 5 meters. It is a traditional system, not unchanging, since we have been told that a new system with wider lands (7 m) is also used. Such new lands have also 2 rows of vines in alternate rows with a stump every 2.5 or 3 meters. It can be observed that this new method reduces the number of ditches thus limiting the planting cost.

PLANTING METHOD AND HUSBANDRY

When planting has taken place in June of a year A

- Three months later (September of the year A) :
 - * Topping of the shoot chosen at 1.60 m in height
 - * Espaliering according to the horizontal pergola system established at 1.70 m of height with bamboo props and galvanized iron wire
- October of the year A : first pruning
- January of the year A + 1 : first harvest for the Chinese new year.
- Rest : 1 month
- February A + 1 : second pruning
- Three and a half, four months later (May-June A + 1) : second harvest
- Etc.

CULTURAL PRACTICES

- Soil : manual weeding without any tillage. The soil is only turned over to remove the roots when the vegetation is too exuberant.
- Green pruning at the blossoming : it consists in removing leaves around the bunches
- Real pruning : it consists in leaving all the lignified shoots with 8 to 10 buds without any other selectivity. During the pruning, all the leaves are removed from the vine.
- Irrigation : in period of high evapotranspiration, the soil, and sometimes the foliage are watered through pumps using the water of the ditches between the rows of vines.
- Fertilization : the plants are generally manured with organic or non organic fertilizers in the proportion of 15-15-15 or 12-24-12 with 300 g per stump before pruning and 45 days after pruning.
- Plant protection : given the climatic conditions, the vine is particularly threatened, especially during the humid period by anthracnose (*Gleosporium Ampelophagium*), downy and powdery mildew. The latter is especially active at the end of the rain falls and early in winter.

The Botrytis is also to be feared during the rain seasons and is treated with specific products.

We have been told that the vines can be treated 30 times per harvest, i.e. a

treatment every 4 days in average, which is considerable. Besides, we can wonder about the possible pesticide residues in the soil, the plant and the grape.

The parasitic insects are treated regularly and do not seem to set particular problems.

- Harvest : the harvest is carried out manually, the bunches being put in small vegetal woven baskets and are transported through the network of canals. As the grape will be consumed as a fruit, the picking is very carefully done.

- Yield : for the white malaga, the wine-grower has mentioned yields varying between 30 and 10 kg per stump per harvest according to the harvest. In his opinion, the drop recorded would be due to the bad cool and humid weather at the time of blossoming.

- For the region concerned (centre) and the white malaga can be found statistics varying from 10 to 15 kg per vine per harvest.

The costs of production are calculated on the basis of an average yield of 1,175 kg per rai (120 stumps), i.e. $1,175 \times 6.25 = 7,344$ kg per hectare (2,940 kg per acre) when the average yield per stump per harvest, according to the same sources, represents 15 kg (1,800 kg per rai = 11,250 kg per hectare = 4,500 kg per acre).

Note : We have been informed that the tests on the vat varieties of the central regions give yields of about 10 kg per stump when the "white malaga" experimented in the Northern part of the country produces 7 kg per stump per harvest as only one harvest is possible in this region.

COSTS OF PRODUCTION

According to the Institute of Horticulture of Bangkok, the average operating cost is calculated as follows :

TABLE 10
Average operating cost of the vineyard in the central region

ITEM	AMOUNT IN BAHT PER RAI PER HARVEST	PERCENTAGE
Pesticides	4,000	32
Fertilizers	2,200	18
Fuels	850	7
Espaliering maintenance	224	2
Pruning	500	4
Equipment	23	
Labour	2,625	21
Total operating expenses	10,442	84
Amortization	107	1
Land capital interest	135	1
Miscellaneous	1,816	14
Total cost	12,500	100

(Source : Institute of Horticulture of Bangkok)

The total cost would thus be 12,500 baht per rai per harvest, i.e. 78,125 baht per hectare or 10.64 baht per kg of grape. the following comments are then suggested :

- The total cost of production is high
- The share of pesticides is considerable although understandable given the large number of treatments made.
- Despite the low level of mechanization, the labour percentage is too high.
- No explanation concerning the "miscellaneous" item has been obtained.
- The amortization of the planting is calculated over a 7-year period.

PRICE AND PURCHASE METHOD FOR GRAPES

In 1988, the company promoting the project pays 14 baht the kilo of grade for the production of brandy. It purchases it through several wholesalers who are in touch with the producers of the central region. The time of transport of the grape by road is 1 to 2 hours.

The price of the grape rounded up to 15 baht/kg is high. It results especially from the costs of production analysed above.

RESEARCH AND EXPERIMENTATION

The Siamese institutes of research have carried out tests in four stations in different geographical and climatic areas.

- in CHIANG MAI and HANG CHAI in the North
- in SRISAKET in the east of Bangkok
- in THACHAI North of the central region

These tests are especially intended to study the development of new vine-plants under different climates more favourable than the central region.

The vinification tests are carried out by the Oenology Laboratory of the University of KASETSART.

We have not obtained the results of the experiments but only fragmentary indications concerning the works in progress. We thought it would have been possible to visit the experimental plots near the university, but those responsible explained us that the vines had been uprooted.

GENERAL RECOMMENDATIONS

In the previous paragraphs we have tried to draw up a kind of inventory of the Siamese viticulture focusing on the central region in which is included the project under study. From such study we draw various general impressions as well as the resulting recommendations.

ADAPTATION TO THE PRESENT VITICULTURE OF THE CENTRAL REGION

Given the limits of the project, the only geographical area to be considered is the central region. However, this region is not favourable to the planting of a vineyard adapted to the production of quality wines.

The reasons why are numerous : climate which is too hot and too humid, soils which are not easily drained, high costs of production requiring high yields not often compatible with quality.

Consequently and for the moment, we can but consider using the present vineyard which allows the production of a technical wine in the conditions and according to the characteristics specified above.

THE FIGHT AGAINST THE INFECTIOUS DEGENERATION OF THE VINEYARD

In the vineyards we visited, we observed numerous serious symptoms of infectious degeneration as regards white Malaga. Besides, this virosis affects dramatically the yields and the quality of the harvests as well as the life cycle of the plants. It is not possible to cure it on the existing plants. On the other hand, it is possible to control its spreading and to limit its effects in three complementary ways :

- Planting in new soils which have never borne vine-plants
- Disinfection of soils before replacing the old plants by new ones (beware of the pollution of the water table)
- Using stocks and grafts not contaminated by the virus. In France, significant improvements have been made since several years in this field, such as the creation of "certified" plants which have an excellent health and a very interesting regularity of production guaranteed (resisting especially to coulure). It is obvious that a strict control of the vegetal propagation and selection must be carried out.

REDUCING THE COSTS OF PRODUCTION : THE HYBRID VINE-PLANTS

The health treatments represent an important part of the cost of production. Such treatments are indispensable and with the present plants they seem unlikely to be curbed. On the other hand, the cost price of the anticryptogamic control could be substantially reduced by the use of hybrid vine-plants generated through specific or interspecific crossings (American vines and vinifera) and generally resistant to downy and powdery mildew.

However, it must be noted that wines from hybrids are not praised for different reasons and to such a point that in Europe, for instance, most hybrid vine-plants have been forbidden, only a few being authorized.

CHOOSING THE DATE OF THE HARVEST

Given the fact that the climate presents a dry and humid season, and that the vineyards produce 2 to 2.5 harvests a year, it would be good to reserve in priority for the production of wine the harvests of the dry season, the grapes picked during the humid season being reserved in priority for distillation.

We can also consider the staggering of the dates of harvest according to the varieties, zones...or, for instance, the needs of the cellar. Such staggering must be programmed right from the planting and especially from the first pruning the date of which determines the first harvest and the succession of the following ones.

CONSIDERING THE DEVELOPMENT IN THE CENTRAL REGION

We have noted that the technical wine must be made, at present, with the vine-plants existing in the traditional viticulture. However, the local production in a medium term, of a wine of better quality due to new plants can be considered. The promoting company of the project offers to supply tree plants to the wine-growers and binds itself to buy the whole harvest.

In our opinion, such provisions are possible only after having been informed of the results of the experiments carried out in the country and more particularly in the central region.

SELECTION OF THE VINE-PLANTS

Since grape is sold by the weight, the main selection criterium for the present viticulture of the central region is the yield. Therefore, as an incentive the new varieties must produce large quantities (and if possible over a short cycle as the Cardinal which allows 5 harvests over 2 years).

As we have underlined above, the wine-grower should also be interested in hybrid plants because of their resistance to disease. Aware of this question, the University of Kasetsart has asked the French nurseries to supply it with different varieties of hybrids the development of which will be studied over a few years.

The following hybrid varieties have been mentioned by Professor BOUBALS of the Higher School of Agronomy of Montpellier (France) :

- Baco 22 a
- Seibel 4686
- Seyve Villard 5276
- Seyve Villard 12375
- Couderc 7120
- Landot 244
- Seibel 5455
- Seibel 8357
- Joannes Seyve 26205
- Seyve Villard 18315

As regards the *Vitis Vinifera* and given the limiting climatic factors and the various selection parameters mentioned above, we think that the following varieties the list of which is not exhaustive would justify tests in the field :

- White Ugni (98 % of the Cognac vineyards in France)
- Carignan (black grape with white juice)

DESIGNING A NEW VITICULTURE

From what has been said, it results that the project concerned, with its technical constraints and limitative factors, can now be carried out only through the present viticultural structures allowing the production of a technical wine .

A more ambitious production of wine of quality implies a completely different wine-growing concept :

- Research of an appropriate site : for instance, hills with light soils in which the water runs off easily and where fogs are not stagnating as in plains or valleys.

- The exposure can also play a capital part as some varieties are better adapted to a Northern exposure preventing them partially from the heat of the sun.

- Research of a favourable climate : probably in altitude must then be chosen a station the most temperate possible with low rain falls and hygrometry at least during the most critical stages of the vegetal activity.

- Exposure to strong winds which can damage some varieties (white Ugni, for instance) must be avoided.

- Research of soils adapted to viticulture : vine-plants can be adapted to a wide range of soils. However, the quality is generally inversely proportional to the fertility of the soil. A high alkalinity often associated to excessive percentages of active limestone constitute a limiting factor which must be taken into consideration.

- Planting of varieties adapted to the production of wines desired. The range of these varieties is wide. The research stations above mentioned have studied a large number of them. It would be useless to recommend any of them within the framework of this study.

- Building of a cellar on the place of production of the wine. For different technical reasons, it is indispensable for the cellar to be built right in the middle of the vineyard and for the time of transfer of the grape from the plant to the vat to be the shortest possible.

- It is obvious that in the choice of the site must be considered the local socio-economic data allowing satisfactory labour, supplies, maintenance and more generally, a good functioning of the wine-growing estate.

ANALYSIS OF THE PROJECT

DEVELOPMENT OF THE PROJECT

THE INITIAL PROJECT

The initial project could be summarized as follows :

The promoter of the project is a distillation plant which grows grapes for the production of brandy. This company is looking for a partner holding 49 % of the capital and able to supply it with grapes appropriate for the production of white and rosé wines as well as its know-how for the local production of wines of quality which are at present supplied by foreign countries.

Late in May 1988, we worked several times with the person in charge of the project, the Deputy Managing Director of the Suwannaphoome Distillery.

Further to these discussions, it appeared that the nature of the project had changed.

THE PROJECT AT THE END OF MAY 1988

The project of joint venture has been given up : the Suwannaphoome Distillery wants to control and finance the whole project.

In the project is no longer included the supply which would be ensured through purchase from the local producers.

At present, the project can be summarized as follows :

Is it possible to produce and sell local wines with a quality similar to that of the imported ones. and how ?

The answer will be twofold :

- the feasibility : what can be done ?
- what is possible : how can it be done ?

A PREREQUISITE : THE DEFINITION OF THE QUALITY

First of all, the term quality must be clearly defined.

TRADITIONAL CONCEPTION OF THE QUALITY

Generally, we call wines of quality wines appreciated by the connoisseurs. Without defining it strictly, it can be said that :

- these wines are produced under temperate climates
- they are obtained from noble varieties
- they result from a subtle oenological know-how.

INDUSTRIAL CONCEPTION OF THE QUALITY

The quality of a wine can be considered only from a technological point of view, as the result of an elaboration process in perfect accordance with a particular book of specifications. Besides, wine can be made as any other technical and industrial product. However, this type of product will not be considered as a wine of quality by the oenophiles.

FEASIBILITY OF THE PROJECT

WHAT IS NOT POSSIBLE

As things are, it is not possible, at present, to make classical wines of quality :

As a matter of fact, if the climate in Thailand does not definitely hamper the production of wines of quality, nothing shows that such production is possible.

On the other hand, no conclusive results have been given by the varieties adapted to the production of wines of quality.

The varieties which are grown at present : white Malaga, Cardinal, Muscat of Hamburg have never proved they can be good wine grapes even though they are excellent as table grapes.

WHAT IS POSSIBLE

Given, on the one hand, the opportunities of the market, and on the other hand the viticultural limits, it is clear that the only strategy to be considered is the production of industrial technological wine, using the grapes available at present, to be consumed by beginners and competing with the local or imported products of the same category.

MARKETING OF THE PROJECT

DEFINITION OF THE PRODUCTS

The white and rosé wines will have to be defined as those of this category according to the following parameters :

- colour : white and rosé
- aroma : more or less pronounced
- alcohol content : average (between 10 and 12)
- sweetness : lightly sweetened
- still or slightly gassy

These parameters will not be defined at random but will result from a very precise survey amidst the potential consumers : the first stage of the project will consist in converting the consumers' expectations into a technical book of specifications.

POSITIONING

As it is mentioned in the chapter concerning the market, the product will have, on the one hand a position in comparison to the local wines, and on the other hand, to the imported wines of the same category. It will be very profitable to analyse both. For imported wines, special attention should be devoted to products such as :

- Masala
- Lancers
- Canei
- Mateus
- Blue Nun

which are the references on the market.

PRICES

They will be determined, on the one hand, according to the costs and margin required for the firm, and, on the other hand, to the acceptability of the market - measured in the period preliminary to the launching.

DISTRIBUTION

The distribution will be mainly ensured by the middle range supermarkets and restaurants. S.D. has a long experience of these circuits that will be precious to implant its products.

COMMUNICATION

The essential ingredient of success. The distributors are complaining about the dullness of the communication campaigns (advertising and promotion) of the wine sellers. S.D. could benefit by the success of its trade mark (Regency) to launch its line of wines - dangerous strategy if the latter would not succeed. However, it would be best to call the line Regency since that will have a strong incentive effect.

COMPETITION

Local products are well protected by the taxation applied to imported products, but there is already a competitor who set up 15 years ago. Of course, the results obtained, as regards the quality and the share of the market, are not fantastic but they mean that :

- Anyhow the Suwannaphoome Distillery wines will be compared to those of United Products.

- If the efforts undertaken by this company in order to offer the best wines possible give average results, a lot of imagination and work will be necessary for Suwannaphoome Distillery to offer wines which will make the difference.

PROFITABILITY OF THE PROJECT

The profitability of the project depends on :

- The competitive advantage in comparison with the imported wines ; it can be evaluated at 90 baht, i.e. at least half the final price of a 0.70 l bottle.

- The capacity of the firm to do better than its competitor United Products.

CALCULATION OF THE PRICE OF THE PRODUCT

The following example presents a possible breakdown of the price of the final product. All costs are largely calculated.

TABLE 11

Breakdown of the price of the final product (0.6250 l bottle)

ITEM	AMOUNT (in baht)	PERCENTAGE
Purchase of grape	15	15
Vinification	5	5
Bottling	10	10
Storing	2	2
Financial expenses	2	2
Commercial expenses	26	26
Cost price	60	60
Margin of the firm	15	15
Selling price ex factory	75	75
Local taxation	7.5	7.5
Distribution margin	17.5	17.5
Retailing price	100	100

MARGINS

Usually, the margins are important. In the example above, we have chosen a rather low margin for the firm in order to favour quality (expenses regarding the purchase of the grape, the vinification and the bottling voluntarily high) and high commercial expenses to guarantee a good promotion of the product. The margin of S.D. could be 15 %, i.e. :

- 15 x 300,000 bottles = 4,500,000 baht when the target of 200,000 liters will be reached.

THE OENOLOGICAL CHAIN

We have asked Mr Alain Mazoyer, oenologist, specialized in the conception of products made with grape, to analyse the Thai wines present on the market and to outline the major directions for a project of vinification unit.

ANALYSIS OF THE PRESENT PRODUCTION

During our trip to Thailand, we collected various samples of Thai wines such as:

TABLE 12

Description of 5 types of wine produced and commercialized in Thailand

N°	BRAND	COLOUR	ALCOHOL CONTENT	RETAIL PRICE	VOLUME
1	COOLER CLUB	ROSE	3.5	15.00	300 cl
2	MASALA	ROSE	12	46.00	312.5 cl
3	MASALA	BLANC	12	46.00	312.5 cl
4	CHAI SRI WINE	RED	12	29.75	312.5 cl
5	THAI WHITE WINE	WHITE	12	29.75	312.5 cl

Analysis of the products: general presentation

The presentation of the wine is rich due to sophisticated labels and qildings. Some brands, such as Masala (Marsala) or Chaisri (Cherry) sound almost like Western names.

Bottling and labelling

The samples studied are only 312.5 cl glass bottles with metallic screw-caps.

The bottles are oblong or spindle-shaped and look more like wine cooler bottles than like wine ones.

The bottling and labelling are closer to the soft drinks category than to the wine one.

Tasting

TABLE 13

Tasting of 5 types of wines produced and commercialized in Thailand

N ^o	BRAND	NOTE/5			OBSERVATIONS
		colour	nose	flavour	
1	Cooler Club	4	4	4	Colour : fluorescent pink, agreeable aroma of red exotic fruit
2	Rosé Masala	3	4	3	Colour : oxidized, flavour: oxidized muscat, exotic wood, gentian.
3	White Masala	4	3	3	Agreeable green yellow colour, oxidized nose, soft and full, heavy, high alcohol content.
4	Chaisri Wine	2	1	2	Blackish rosé yellow colour, lightly acid, wooden taste, Xeres flavour
5	Thai White Wine	5	3	2	Very beautiful green colour, fruity aroma, disagreeable taste, rance, almond associated to exotic wood

Our global impression is rather good for the most appreciated product, the Rosé Masala, and good for the cooler the fluorescent colour of which is very original.

Generally, the colour of the wines is correct as well as the aromas, but as regards taste, these wines have not the qualities of French wines, especially because of their amertume and exotic wood characteristics which can be found in several of them.

It would be interesting to know if these tastes are appreciated by the Siamese consumer or if they only result from a poor control of vinification.

Analysis

TABLE 14

Analysis of 5 types of wine produced and commercialized in Thailand

N ^o	BRAND	TOTAL	VOLATILE	FREE	CARBON	SUGAR
		ACIDITY	ACIDITY	SULPHUROUS	DIOXIDE	g/l
		g H ₂ SO ₄ /l	g H ₂ SO ₄ /l	ACID mg/l	mg/l	
1	COOLER CLUB	4.20			2,400	41
2	ROSE MASALA	3.80	0.23	13	< 100	31
3	WHITE MASALA	4.00	0.26	10	< 100	38
4	CHAISRI WINE	5.00	2.90	5	< 100	44
5	THAI WHITE WINE	4.65	0.30	8	< 100	35

The following comments are generated by the analysis :

- Total acidity generally correct facilitating a good ratio alcohol/acidity ;

- Volatile acidity relatively low except for Chaisri wine, thus confirming tasting. This high volatile acidity is not incidental to bottling. The product is stable, having been bottled as it is ;

- Free sulphurous acid : almost absent ;

- Carbon dioxide : only traces, unfortunately.

- Sugar : in average, these wines contain less than 40 g/l. This sugar offsets an absence of structure and dry matters, but is not unduly dosed.

On the other hand, despite the absence of free sulphurous acid and the presence of sugar, these products show a surprising biologic stability. A test has confirmed that it is impossible for these wines to undergo a secondary fermentation or any other bacterial development.

CONCLUSION REGARDING THE PRESENT PRODUCTION

Despite the very particular tastes of the wines tested, and notwithstanding that, we have been surprised by the general quality of these products which are very similar to an average French table wine with regard to colour and aromas. It seems that these characteristics are due to a certain laxism of the vinification methods and the processing of the harvest and the wine.

Therefore, it can be thought that an orientation towards technological products and an excellent control of the production and bottling stages would lead to wines particularly agreeable and adapted to the taste of the Siamese consumers as well as to foreigners'.

It seems reasonable to consider the possibility to produce of higher quality than those tasted and with a more pronounced Western type .

Given the Siamese environment as regards wine production and the previous analyses, we can conclude that the project is feasible subject to :

- a good definition of the products to be made
- a good definition of the production and bottling techniques.

The products which can be made, mentioned in the paragraph *DEFINITION OF THE PRODUCTS* (see above), will be technological products which, for example, could have the following characteristics :

- White wine : fresh, aromatic, fine, thirst-quenching ;
- Rosé wine : fresh, fruity, fine, slightly robust to be different from the white wines.

DEFINITION OF THE TECHNIQUES OF PRODUCTION

The basic product to be used for vinification is a fraction of the production of table grapes of the region of Bangkok, as it was determined previously.

However, we suggest to use concentrated musts of wine grapes of French origin and specially prepared for a subsequent vinification after reconstitution and blending with local musts .

This source of supply, considered as a complement to the local supply, would lead to wines of a much better quality than those produced at present.

From a technical point of view, this method of production is very interesting but implies thorough studies and decisions regarding taxation and regulation, as well as law.

The chain of production to be considered should imply a perfect control of each stage of production, i.e. :

- Reception and processing of the vintage ;
- Pressing ;
- Processing of the musts, before fermentation ;
- Fermentation ;
- Winery operations after fermentation and storage
- Bottling and labelling

Reception and processing of the harvest

Requiring :

- Destemming and optional crushing of the vintage ;
- Automatic sulphiting
- Refrigeration ;
- Possible maceration of the vintage.

Pressing

Requiring :

- Horizontal mechanical or air press : the number of apparatuses and their capacity will be determined according to the paces and quantities to be processed.

Processing of the musts

Requiring :

- A system for the pressing of the musts and a dynamic clarification ;
- A possible refrigeration : 15°C at least ;
- A continuous processing system for the musts.

Fermentation

The fermentation operations must be carried out within 8-10 days in vats containing about 400 hectolitres.

During this operation, the temperature, yeasts and speed of fermentation should be perfectly controlled.

It will be preferable to have stainless steel fermenters, equipped with a built-in system of control of temperature.

Winery operations after fermentation and storage

After fermentation, the wines must be clarified very quickly. An adapted system of clarification and filtration must be installed.

The fermenting room can be used for storage, on the condition that it can be hermetically closed.

Bottling and labelling

At this stage, of course, the main points will be once again the hygienic control, as it is the case during the whole production, and more especially :

- the control of carbon dioxide ;
- the control of oxygen during bottling ;
- the control of the requirements and present and future variations of the production ;
- the control of the packaging requirements, shape of bottle, corking, get up, presentation.

The precise definition of a chain of production, the selection of a specific equipment and the evaluation require very detailed data depending on the strategy determined by the firm after an indispensable stage of technical and commercial experimentation.

SCHEDULE OF THE PROJECT

Given that the Suwannaphoome Distillery has not yet carried out any study, neither technical nor commercial or financial, for the project, it seems indispensable for a period of time to be devoted to thorough studies before any decision be made concerning any capital investment.

TECHNICAL STUDY AND MARKETING OF THE PRODUCT

It is the first and essential stage which should be preliminary to any other reflexion. The will of the Suwannaphoome Distillery to undertake this project shall be sealed by the decision to start such study. It has not been provided for in the project as if the question of the perfecting of the product and its acceptability by the market did not set any particular problem. This stage should comprise :

- The hiring of an oenological engineer of high level whose work will be the perfecting of the prototypes of the products.
- The setting up of a test laboratory with all the equipment necessary to carry out micro-vinifications and perfecting of the products.
- Tests for the models of presentation (bottle, label, name of the product)
- Market surveys to measure the acceptability of the products, with blind tasting and meetings of test groups .

Given the time necessary to find an oenologist responsible for the tests, to install the laboratory, to create the samples, design the models, carry out the market surveys , 15 to 24 months can be considered at this stage.

In parallel with such tests, the engineering studies and the contacts with the equipment suppliers will have to be intensified during this period.

LAUNCHING STAGE

According to the results of the preliminary studies, it should take place within 15 to 24 months.

It is important to note that S.D. being a distillery has already the equipment necessary to produce wine (except the indispensable arrangements regarding storing under controlled temperature). S.D. can thus perform the launching stage without any substantial investment the amount of which the firm could save in case this stage were not to meet the success expected (time required : 1 to 2 years).

GROWTH STAGE

Should the result of the launching stage be positive, the decisions concerning the equipment, the manpower and commercial aspect will then be made.

Three to four years will be necessary to reach the target of 200,000 liters.

In fact, the total growth of the market is about 100,000 liters per year. Therefore, a yearly growth of 50,000 liters would be a good performance for the Suwannaphoom Distillery.

RECOMMENDATIONS

ADAPTATION OF THE REGULATION

The regulation should be revised in order to facilitate the production of local wines.

The quality of the wines produced in Thailand is dramatically limited by the absence of grapes adapted to a quality production. This handicap could be offset by the local producers through the adding of a certain proportion of imported concentrate which would not affect the name -"Thai wine"- of the final product but would furthermore entail the boom of the wine industry in Thailand.

SHORT TERM STRATEGY OF THE FIRM

- Quick launching of the experimental process preliminary to the launching of the products.
- Use of available grapes (white Malaga, Cardinal, muscat of Hamburg) to create prototypes of wines.
- Hiring of a specialist, an oenologist in charge of the test policy.
- Training of the executives and officers concerned by stays and travels in the most interesting wine-growing areas.
- Taking on as partner a foreign firm specialized in the perfecting of new wines.
- Testing of the products obtained with the local consumers.
- After 12 to 24 months, making the decision to launch or give up the project.

MEDIUM TERM STRATEGY OF THE FIRM

- Carrying out of the expansion stage of the project.
- Taking part in the experiences in progress concerning varieties and oenology.
- Considering the possibility of creation of particular fields of experience.
- Conclusion of agreements with foreign firms specialized in the wine technology.

PROPOSITION FOR A TECHNICAL AND COMMERCIAL COOPERATION

As the Thai firm in charge of the project has no experience as regards the production and commercialization of wine, a partnership with a foreign group specialized in these questions should be considered. Given the worldwide admitted French superiority in the field of vitiviniculture research and development, and the general competence of the French operators in this sector, a profitable cooperation could be considered with a French group having all the required technical and commercial competences .

VITICULTURAL COOPERATION

This aspect is not to be considered within this study as it concerns the renovation and modernization of the Thai vineyards . It has to be studied by the local vinegrowers and the research authorities. A viticultural cooperation would intend to solve the problems presented in the section of this report regarding Viticulture . We can mention two types of action which could interest the French professionals and especially our nurseries :

- The fight against the infectious degeneration of the vineyard, especially through the use of French certified plants ;

- The reduction of the costs of production, through the protection of the plants against diseases and the selection of the vine varieties.

These actions concern the whole Thai vineyard and intend to increase its technical and economic performances.

COOPERATION FOR THE PRODUCTION OF WINE

The following offer concerns the performing of our recommendations and the carrying out of the first stages of the project as they are explained in the sections *The oenological chain* and *The schedule of the project* of this report. It concerns a contract of technical cooperation between a French group and the Thai partner with the following characteristics :

- The French group will provide a technical assistance as regards :
 - * The technical and commercial preliminary studies ;
 - * The definition of a strategy for the Thai firm ;
 - * The definition and the installation of the production structures ;
 - * The follow-up of the stage of commercial launching.

- This assistance, provided for two years, will be made up of three stages :
 - * The definition of the experiments programme and of the means to be used. This three-month stage will imply the hiring, over a period of 21 months, of a graduate oenologist presented by the French partner, and the installation of a laboratory the characteristics of which will be presented by the French group as well. During this stage the experimentation programme will be defined ;
 - * The technical and commercial follow-up of the experimental stage : this phase will imply the carrying out of prototypes of wines, market surveys, the definition of the strategy and of the production structures. It will probably cover a 12-month period ;
 - * The assistance during the launching stage. This stage, which will probably last 9 months, will imply the installation of the production structures, the training of the local personnel and the follow-up of the launching stage.

- Each stage will have a specific programme, so that it will be possible to stop or to continue the cooperation at the end of each first two stages.

- The budget forecast and presented below is only indicative. The authors of this report shall not be bound by it, nor shall they be committed for the actions recommended, the amounts and scales mentioned.

Indicative budget for a contract of technical assistance

SUCCESSIVE STAGES OF THE PROJECT	FRES (US\$)	EXPENSES (US\$)
STAGE 1 : definition of the experimentation programme and of the means to be used :		
- 16 days : US\$ 2,000 per day	32,000	
- travelling and accommodation expenses		10,000
STAGE 2 : technical and commercial follow-up of the experimental stage :		
- 20 days : US\$ 2,000 per day	40,000	
- travelling and accommodation expenses		12,000
STAGE 3 : assistance during launching :		
- 20 days : US\$ 2,000	40,000	
- travelling and accommodation expenses		12,000
TOTAL	112,000	34,000

* Local launching of the project :

Indicative budget for the first local stages of the project

EXPENSES	AMOUNT (US \$)
Hiring of a graduate oenologist over a 21-month period :	
- 21 months : US \$ 5,000 per month	105,000
Tests laboratory (equipment)	40,000
Tests laboratory (operating)	
- 21 months : US \$ 1,000 per month	21,000
Market surveys	60,000
TOTAL	226,000

GENERAL CONCLUSION

AS REGARDS THE FRANCO-THAI PROJECT OF JOINT VENTURE

In the preliminary project of 1987, a joint venture, between the Thai firm in charge of the project and a foreign company, preferably of French origin, had been considered, the foreign partner providing the technology and the know-how for the production of wines of quality.

The capital of the incorporated company would have been : 51 % for the Thai firm and 49 % for the French one.

At present, the Thai firm in charge of the project thinks that it has the resources necessary to finance it alone.

The joint venture project, at least in its financial aspect, has thus been given up.

On the other hand, a technological cooperation is necessary - and desired by the Thai firm - for the carrying out of the project if it is put into force.

This cooperation would concern two aspects :

- The oenological chain : assistance for the conception, elaboration and preserving of the products.

- The viticulture : the local firm will not produce grapes but will have technical actions and a cooperation policy with viticulture (experimentation, recommendations to vinegrowers as regards the selection of the varieties, contracts of purchase of the grape).

AS REGARDS THE TECHNICAL FEASIBILITY OF THE PROJECT

The answer to the question asked cannot be ambiguous, so it will be different according to the meaning of "wine of quality".

Classical meaning of "wine of quality"

Given the present conditions, and an unavoidable factor, the climate, it is not possible to consider the production of wines of quality competing with the imported ones.

All the wines admitted worldwide to be "wines of quality" are produced in regions having a temperate climate.

There is no conclusive example relating to a vineyard of a humid tropical region producing "wines of quality". Nothing proves absolutely that such production is quite impossible, but, on the contrary, no element allows to assert that the said production is technically and economically possible in Thailand.

Therefore, a company project based upon this strategy cannot be recommended at the present moment. This opinion will, maybe, be modified by the results of the experimentations in progress.

Industrial meaning of "wine of quality"

If the concept of "wines of quality" is extended to the "technological wines", obtained through an industrial process of manufacturing applied to the raw material constituted by the grapes, the strategy is different. A standard and reproducible product, with characteristics essentially determined in function of the identified needs of the market and intended for precise segments of consumers, should be perfected.

It can be considered that they are also wines of quality, the term "quality" being differently understood as the quality of industrial products and more especially of agribusiness products and not as the quality of the traditional soils, varieties and winemaking methods.

When speaking of technological wines, the key factor is the industrial process and manufacturing as the grape is only a raw material on which is applied such process. The standard product desired is thus obtained, selecting its characteristics :

- colour
- aromas
- alcohol content
- sweetness scale : from "dry" to "sweet" wines
- from "still" to "pearl" wines.

Such a strategy can be considered by the firm with some chance of success, especially if the company has the possibility to use French concentrated musts during the winemaking operations.