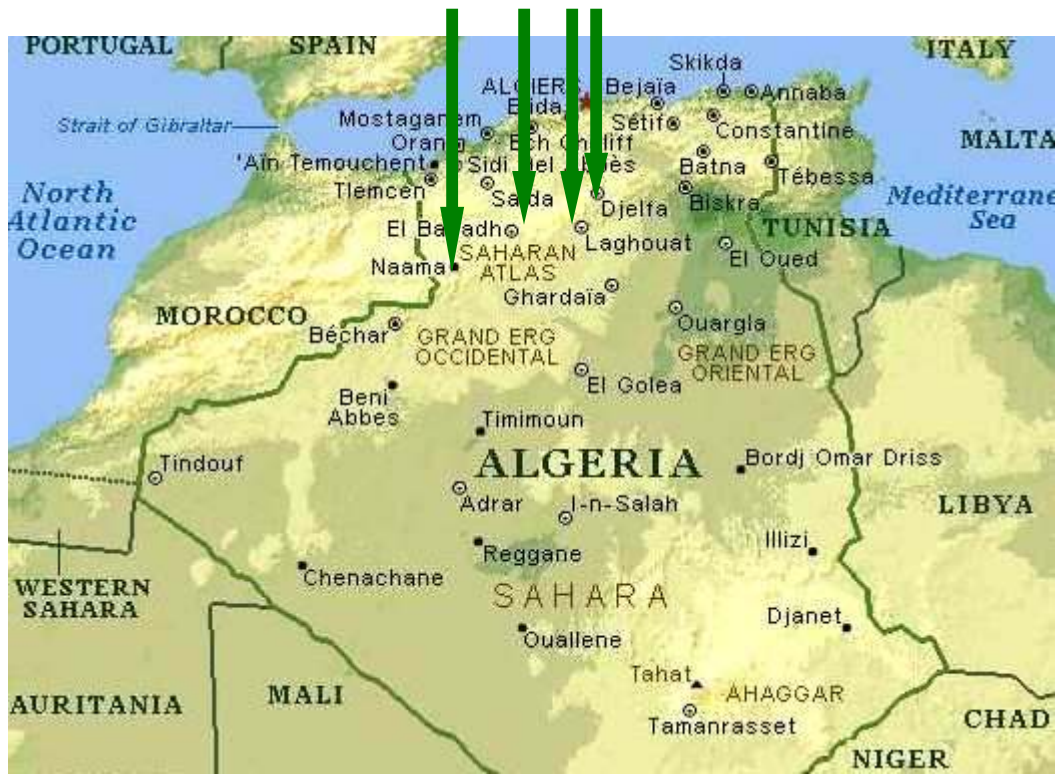


FEASIBILITY OF GROWING JATROPHA CURCAS IN ALGERIA

A first orientation

D1oils Plant Science Ltd



21/08/2007
Ab van Peer
D1Oils Plant Science Agronomist

Introduction

1.

On the 23 of July 2007 D1oils.plc received an e-mail from a company named Sarl Dartly.

Sarl Dartly proposed a joint venture with D1 oils, for the development of Jatropha plantations in Algeria. (page 10-11, French and English)

The mail was signed by Mr.Boubakar Tourqui, who is representing Sarl Dartly in France.

2.

During a brief conversation between Henk Joos and Boubakar Tourqui, it was decided to organize a first orientation meeting, mainly focusing on agronomical issues.

3.

The meeting between Boubakar Tourqui and Ab van Peer was held on August 15 in Paris.

Conclusion of the meeting and future steps to take have been written down by Boubakar Tourqui and sent by e-mail on August 15. (Page, French and English)

The following report provides:

General Information and background	Page 3
Conclusions and recommendations	Page 4-5
Criteria and Climate Data	Page 6-10
Communication	Page 11-13

GENERAL INFORMATION AND BACKGROUND

A.

The company

Sarl Dartly is a project developer and facilitator, based in Algeria.

Boubakar Tourqui is representing the company in France.

Up till now we have no information about the company regarding number of people, capital, scope of work etc. **This should be provided before our next meeting.**

The company is located in Boufarik, about 35 km from the capital, Algiers. In Boufarik you also find the main airbase from the Algerian army and an important agricultural development, mainly in citrus and vegetables

Boubakar claims that this location provides them with excellent contacts in the Army (Army is involved in desertification projects) and the agricultural research facilities.

B. The project.

The project has three objectives:

1. Political.

There is great concern that the Sub Saharan part of Algeria becomes an underdeveloped and therefore politically unstable area. This is the reason that in this area many new projects are being developed with a lot of support from the government. The planted areas will mainly be on government land as well.

2. Humanitarian and Economical

Strongly linked to objective 1, the goal is to provide work and income for the people living in the Sub-Saharan zone.

3. Environmental

Aim of the project is to create a massif range of plantations of *Jatropha curcas* along what is called “Le barrage vert”, a green barrier along the northern borders of the Algerian Sahara. Most of the area is table land. Right now some forestry projects in the same area are being undertaken by the Army. All the projects are undertaken in- and along the Southern foothills of the Atlas Mountain range, to create a barrier against the desert. The projected *Jatropha* plantations are also located here and could cover tens of thousands of hectares, owned by the government.

Realization of such a huge and challenging project on the doorsteps of Europe would create a lot of interest and could become a major pilot project for research and development.

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

As shown on the Crop Suitability map for Jatropha in Africa (page 6), the selected area's are out of the sub optimal growing zone(yellow) and in the marginal growing zone (orange)(above 30°N) and especially at higher altitudes close to the unsuitable growing zone. (red)

Also the climate data (page 7-9) so far are not in favor of growing Jatropha on the requested sites:

1. Temperatures, especially in winter, are too low to make Jatropha a viable crop for these areas.
2. Average altitude of the proposed sites varies between 750-1300 meter. In combination with the low temperatures in winter this creates a huge risk for frost damage and total eradication of the project. These lands are not suitable for Jatropha cultivation.
3. Since there is only 200-350 mm per year, all the projects are depending on irrigation. From a management point of view this is a plus, from a costing point of view, it is a minus.

RECOMMENDATIONS

1. Since the selected districts stretch over several °N latitude (30-35), it might well be possible to locate area's which are suitable for growing Jatropha. This area's should be as far South as possible and off the table –lands or at altitudes lower than 250 meter.

However, the actual available data are not sufficient to support that hypothesis. **More data is needed, probably combined with selective field visits and expertise knowledge before a positive conclusion can be drawn and before any other action should be taken.**

2. Since rainfall in the selected areas does not exceed 350 mm. a year, all the projects are depending on irrigation. It has to be verified whether enough irrigation water of reasonable quality is available.

3. Projects of this scale could become a natural barrier against desertification and therefore should not consist of mono crops. In this case the introduction of Pongamia pinnata, another oil crop, could be considered.

4. Apart from the Agronomic aspects, more information is needed about the company Dartly and their capability to handle a project of this size.

5. Logistics. All locations are 400-500 km away from the nearest harbor. Although roads are good and transport is subsidized by the government (**to be verified**) there is a major concern regarding costs in case oil is going to be exported,

6. Next steps to be taken are also mentioned on page 12-13 in the e-mail from Boubakar Tourqui.

1. Between 15/8 and 15/10. Complete all the needed information regarding: Climate (precipitation, wind, temperatures etc) both rough and more specific data.

Local site conditions, a first occasion to discuss feasibility with local authorities.

2. Visit to Algeria (mid October, beginning November, (**see conclusions and recommendations. AvP**) to visit the two districts Naama and Djelfa. Verification of local conditions and meeting with local authorities (secretaries of Agriculture en Environment, government, and other institutions)

3. At the end of the 2e phase, and presuming that all the aspects regarding the feasibility have been covered satisfactory, implementation of an experimental area of 500 has should be considered in one of the districts and, if conditions are the same, in the 2e district as well.

CHARACTERISTICS OF THE PROPOSED AREA'S

1. 4 districts are being suggested for further investigation:

Wilaya de Nama, latitude 33°N, longitude 0, altitude 1176 m

Wilaya de Djelfa, latitude 34°N, longitude 2°E, altitude 1126 m

Wilaya de Laghouat, latitude 33°N, longitude 2°E, altitude 750 m

Wilaya d El Bayadh, latitude 33°N, longitude 1°, altitude 1304 m

All the districts are in size that big that they cover about 5° latitude, between 35°N and 30° N

2. Water.

General rainfall in these zones will be between 200 and 350 mm/year.

Irrigation water is available in the oases (surface water) and from aquifers.

3. Temperature

Temp. Naama °C	January	February	March	April	May	June	July	August	September	October	November	December
Average max	9.5	12.6	16.6	19	27.9	32.9	35.8	35.3	26.2	22.4	15.3	11
Average min	1.1	1.2	3.2	6	9.7	13.9	19.8	19.1	15.8	9.8	5.7	3
Average	5.3	6.9	9.9	12.5	18.8	23.4	27.8	27.2	21	16.1	10.5	7

Temp. Djelfa °C	January	February	March	April	May	June	July	August	September	October	November	December
Average max	9.8	11.4	14.1	18.1	23.1	29.3	33.7	32.6	27.5	20.4	14.4	10.9
Average min	0.1	1.4	2.3	5.7	9.5	14.7	17.6	17.1	13.2	8.2	3.8	1
Average	5	6.4	8.3	11.9	16.3	22	25.7	24.9	20.4	14.3	9.1	5.9

Temp. El Bayadh	January	February	March	April	May	June	July	August	September	October	November	December
Average max	10	15	18	20	26	32	34	32	28	24	14	12
Average min	0	2	8	9	12	16	22	20	16	12	8	4
Average	5	8.5	13	14.5	19	24	28	26	22	18	11	8

Temp. Laghouat °C	January	February	March	April	May	June	July	August	September	October	November	December
Average max												
Average min												
Average	7	8	12	16	21	26	30	28	24	17	12	7

4. Altitude differs per location, it is not clear yet whether plantations are planned on the plateaus or in lower areas

5. Soil will be sandy loam with occasional salinity problems.

As a reference, the proposed locations are being compared with the only *Jatropha* plantation in North Africa, the 5000 ha *Jatropha curcas* plantation in Luxor, and the D1 oils Regional Development Center in Swaziland. Both locations are considered of being on the edge of good growing conditions for *Jatropha curcas*.

The plantation in Swaziland is rainfed + irrigation

D1oils RDC, Swaziland, latitude 26.14°S, 31.21°E, altitude +/-300 meter

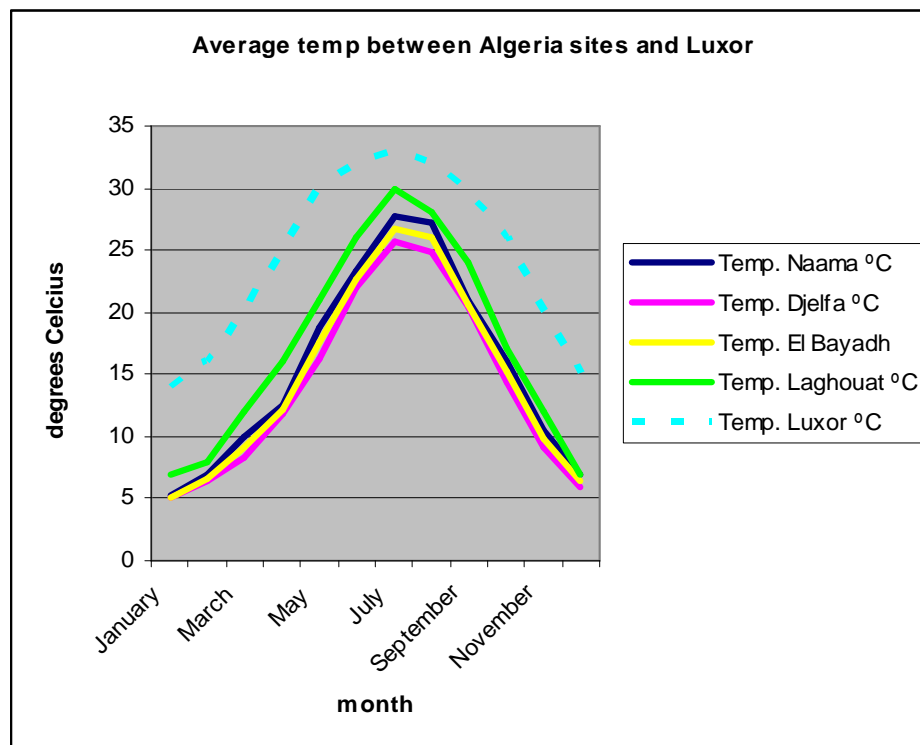
Temp. RDC °C	January	February	March	April	May	June	July	August	September	October	November	December
Average max	28.9	28.1	26.9	25.7	25.5	24.8	23.2	24.5	25.1	25.2	27.6	27.0
Average min	19.3	18.1	18.4	15.9	12.8	9.7	9.6	11.1	13.3	13.8	17.9	N.R
Average	24.1	23.1	22.7	20.8	19.2	17.3	16.4	17.8	19.2	19.5	22.8	23.0

The plantation in Luxor is 100% depending on irrigation (in this case with treated sewage water) and started to yield in the 2e year after plantation. The same situation would occur in Algeria.

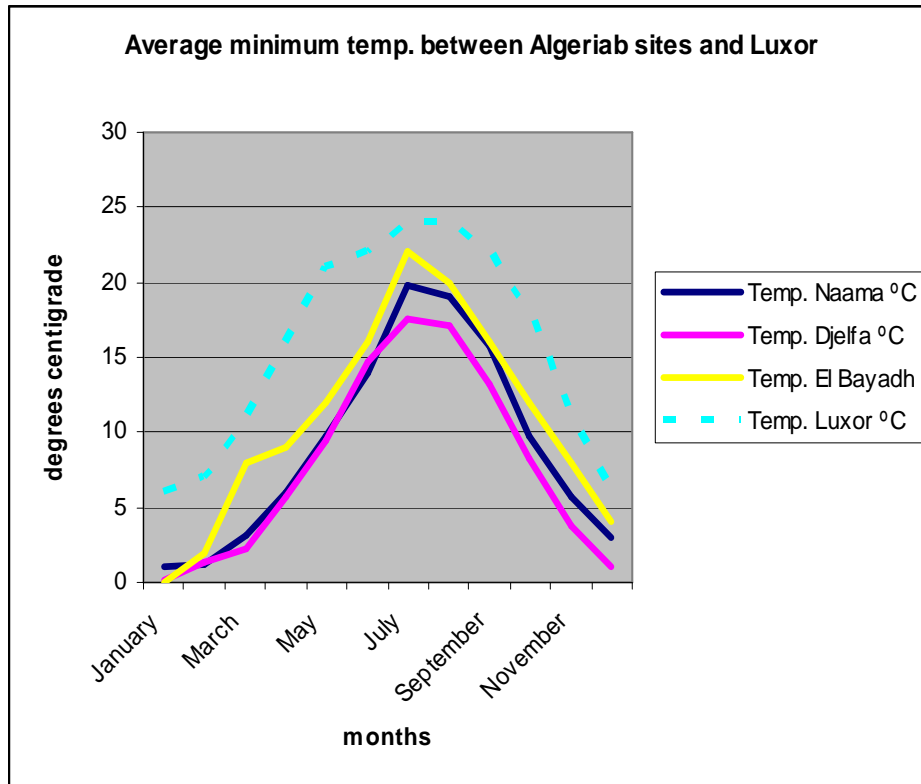
Luxor, latitude 25 66 °N, 32 70 °E, altitude 88 m

Temp. Luxor °C	January	February	March	April	May	June	July	August	September	October	November	December
Average max	22	24	28	34	38	40	41	40	39	34	28	23
Average min	6	7	11	16	21	22	24	24	22	18	11	6
Average	14	16	20	25	30	32	33	32	30	26	20	15

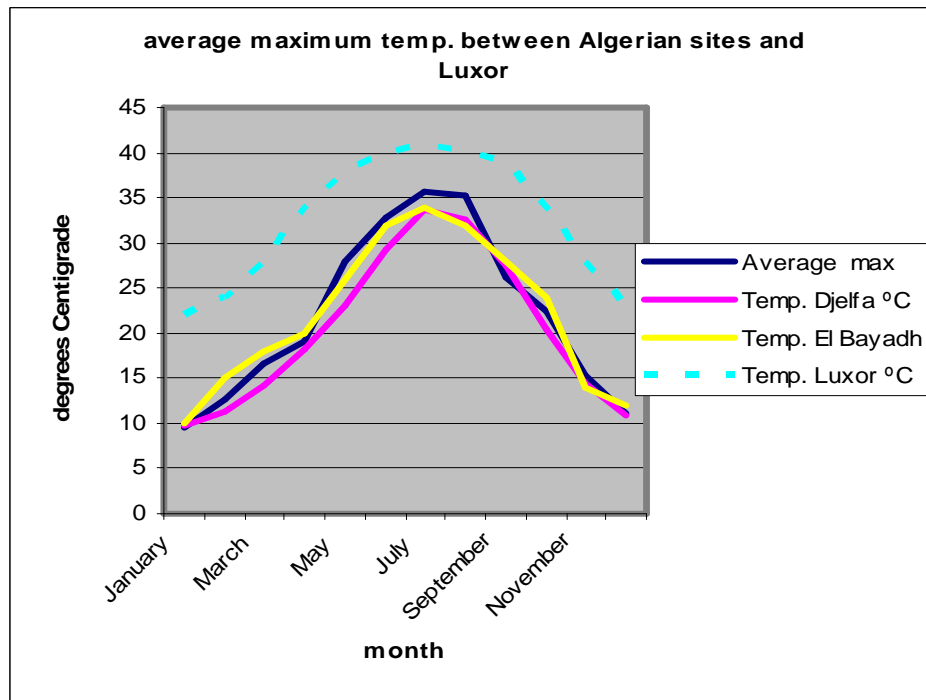
Comparing average temperatures of the different sites



Comparing average minimum temperatures of the different sites



Comparing average maximum temperatures of the different sites



Latitude of the Luxor project is almost 10° more south, the altitude is only 88 meter above sea level, while temperatures are almost 10 degrees higher than in Northern Algeria. Even if minimum temperatures will be low, there is no risk of frost in Luxor.

From: Dartly [mailto:daretly@yahoo.fr]

Sent: 23 July 2007 10:43

To: Graham Prince

Subject: partenariat Algérie

D1 huile le PLC

Elliott Mannis

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United Kingdom

Téléphone : +44 (0) 1642 755580

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Email : gprince@d1plc.com

A l'attention de M Prince

Monsieur,

Nous sommes convaincus, que l'avenir des bio-huiles et bio-carburants auront un rôle déterminant dans l'économie de demain.

L'expérimentation à travers le monde, et en particulier en Inde de la plante **jatropha** : source de la matière première, offre de réelles possibilités d'exploitation de cette plante. Son rendement ,sa faible consommation en eau, sa résistance aux terres semi-aride offrent une perspective d'exploitation intéressante pour nos régions des hauts plateaux en Algérie. Les efforts du gouvernement Algérien pour la valorisation des surfaces utiles (irrigation, forages et barrages) nous permettent une utilisation importante de ces nouvelles terres exploitables.

Nous avons la possibilité d'animer à travers notre société (**DARTLY**) un projet d'envergure qui serait inscrit dans l'esprit d'une exploitation intensive de ce type de production à vocation – bio - huile et bio carburant-

Les financements complémentaires sont possibles (institutionnels, banques arabes et organismes multi-latéraux). Ceci, d'autant que le gouvernement algérien soutien les projets agro-industriels à forte main d'oeuvre, ce qui correspond à l'exploitation du **Jatropha** dont la récolte se fait manuellement.

Votre compagnie étant précurseur, et ayant un savoir faire important, nous intéresse pour la mise en place d'un partenariat.

A cet effet, et en cas d'accord, nous sommes prêts à vous recevoir en Algérie pour une étude concrète de notre association. Au préalable, un approfondissement des tenants de notre collaboration se fera d'une manière épistolaire et par e-mail, et ce pour la détermination de notre projet.

Yours sincerely

Boubaker TOURQUI

+33 630 959 816

SARL DARTLY

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Translation of the above letter from Sarl Darty to Elliot Mannis

To the attention of Mister Prince,

Dear Sir,

We are convinced that bio-oils and bio-fuels will play an important role in tomorrow's economy.

Experiments all over the world and in particular in India with Jatropha as a feed stock are showing real possibilities regarding the exploitation of this plant. High yields, low water consumption and drought resistance are offering an interesting perspective for the exploitation of this plant on the table lands of some regions in Algeria.

The efforts from the Algerian government to stimulate the use of useful land by providing irrigation, wells or dams offers us the possibility to make use of these important arable area's.

Trough our company (Dartly) we have the possibility to create an all embracing project with the goal to produce bio- oils and bio-fuels trough intensive cultivation. Additional financing will be possible (Institutional, Arab Bank's and multi-lateral organizations.) since the Algerian government is supporting labor intensive agro industrial projects. Cultivation and manual harvest of Jatropha certainly fits in these projects.

Since your company is in the frontline of this business, we are interested to set up a joint-venture.

We are ready to receive you in Algeria to discuss the final details of our future co-operation. Before that, exchange of necessary information regarding the contents of our project could take place by mail or e-mail.

Yours sincerely
Boubakar Tourqui
+33 630 959 816

----- Original Message -----

From: [Dartly](#)

To: HJoos@d1plc.com

Cc: avanpeer@d1plc.com

Sent: Wednesday, August 15, 2007 6:16 PM

Subject: partenariat algérie

Monsieur Henk Joos,

Nous avons eu aujourd'hui, Monsieur Ab van Peer et moi-même un entretien fructueux concernant l'introduction du Jatropha en Algérie. Tous les aspects de la problématique ce cette initiative ont été abordés, et en particulier les aspects purement agronomiques, qui sont les fondamentaux d'un tel projet. Il s'avère que les deux wilayas qui peuvent accueillir

les plantations sont NAAMA et DJELFA dans leur versant sud. D'autres wilayas offrent les mêmes caractéristiques, mais le choix de celles-ci résultent du fait que nous avons les introductions auprès des autorités administratives et institutionnelles.

Dans ce cadre un plan de travail en 3 phases a été retenu :

1. **15 août - début octobre** : Compléter les informations, sur: la climatologie (précipitations, vents, températures etc...) avec des données globales et affinées ; la nature des terrains et une première approche de faisabilité en concertation avec les autorités locales.
2. Mission en Algérie prévue entre **mi-octobre et début novembre (10 à 15 jours)**. Au cours de cette mission une visite sera organisée sur les deux sites (Naama et Djelfa), pour valider les données sur le terrain, et conforter les relations avec les différents intervenants du projet (administration, ministère de l'agriculture, ministère de l'environnement ; et autres institutions)
3. A la fin de cette deuxième phase, et dans la mesure où tous les paramètres de faisabilité sont confirmés ; il sera envisagé l'implantation du Jatropha pour une expérimentation de terrain sur une surface de 500 ha sur l'une des wilaya , et si les conditions sont réunies de la réaliser sur la deuxième wilaya.

Pendant toutes ses phases préparatoires : Daretly, apportera tout son concours, en mettant les moyens pour la pleine réussite des missions, en intégrant les compétences d'un ingénieur agronome spécialiste des régions semi-arides, et en faisant appel aussi, si nécessaire, à des consultants pour chaque partie exigeant l'intervention d'un spécialiste.

Aspects partenarial :

Pendant cette phase d'initiation du projet, un protocole d'accord entre « Daretly » et « D1 », spécifiant les tâches et responsabilités de chaque partie sera mis en oeuvre, et ce, avant la fin de la première phase.

Un projet vous sera présenté incluant la partie du financement prévisionnel, en sachant par ailleurs que les frais seront pris à moitié (50%) par chacune des deux parties.

A la fin de la troisième phase, une société mixte de **Gestion de Production et de Développement du Jatropha en Algérie**, sera envisagée, celle-ci pourra intégrer d'autres intervenants financiers, institutionnel ou autres sociétés.

Ceci, bien sûr, est à considérer comme suggestion, et nous attendons s'il y a lieu vos propres propositions

Pour information, dans le cadre de Daretly, je suis en charge de ce projet, et j'assumerai toute la coordination et le management de la partie algérienne.

Meilleures salutations

Boubaker Tourqui
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Translation of e-mail (page 12) dd.15/08

Mr. Joos,

Today Mr. Ab van Peer and I had a fruitful meeting regarding the introduction of Jatropha in Algeria. All the specific problems regarding this initiative have been elaborated, especially the agronomic aspects, being the fundamentals of a project like this.

It seems that the southern parts of the two districts Naama and Djelfa are suitable for plantations (*see conclusions and recommendations. AvP) The other district has the same characteristics, but using this area's also depends on the way we are going to present it to the government and institutional organizations.

Regarding the steps to take, there are 3 phases to cover.

1. Between 15/8 and 15/10. Complete all the needed information regarding: Climate (precipitation, wind, temperatures etc) both rough and more specific data.

Local site conditions, a first occasion to discuss feasibility with local authorities.

2. Visit to Algeria (mid October, beginning November, **see conclusions and recommendations. AvP**) to visit the two districts Naama and Djelfa. Verification of local conditions and meeting with local authorities (secretaries of Agriculture en Environment, government, and other institutions)

3. At the end of the 2e phase, and presuming that all the aspects regarding the feasibility have been covered satisfactory, implementation of an experimental area of 500 has should be considered in one of the districts and, if conditions are the same, in the 2 district as well.

During all the 3 phases Dartly will fully support the process by making the means available to make sure that the preparation process becomes a success. This includes the assistance of an Agricultural engineer specialized in semi-arid conditions and other consultants if needed in a specific area's.

Aspects of the joint venture

During the initial phase (1) of the project, a memorandum of agreement (Dartly and D1) should be in place, stipulating duties and responsibilities of each party. This agreement should be discussed and ready before the start of Phase 2.

A final project will be presented to you, including a preliminary budget, assuming that each partner should count for 50% of the costs.

At the end of the third phase a company (Management of development and production of Jatropha in Algeria) is supposed to be set up, as the vehicle to deal with other financial recourses, institutions etc.)

This is, of course, a suggestion and of course we are expecting your own proposals as well.

For your information, in the name of Dartly, I will be in charge of the project and I am fully responsible for co-ordination and management of the Algerian part.

Boubakar Tourqui

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