

---

# Chott El Jerid

## The sea in the Sahara

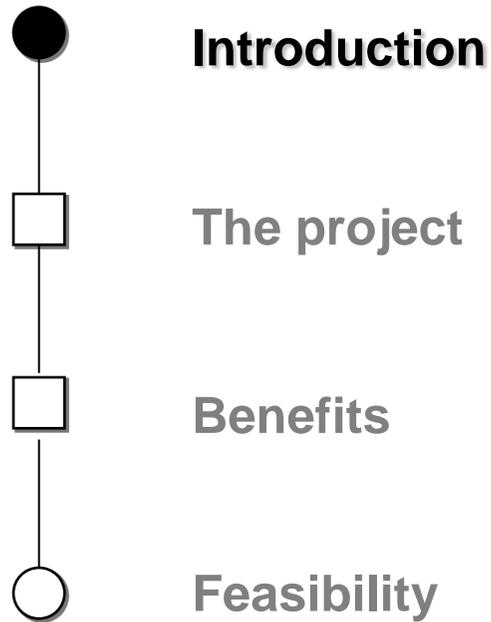
Copyright 2015: Antonio de Martini - 10 Lungotevere dei Mellini, Rome (Italy) - [antionodemartini@gmail.com](mailto:antionodemartini@gmail.com)

Preliminary project

April 2016

# Structure of the document

---



# Introduction



*Tunisia, covering 64,000 square miles, has just under 11 million inhabitants, 85% of which living in the northern part of the country.*

*Chott el Jerid, covering 2,300 square miles, represents 3.67% of the country's total area.*

*The Chott is located on the edges of the advancing desert.*

# Definition of "Chott"

---

*"Chott" , the Arabic word for "shore", is a muddy flatland that turns from dry to quicksand according to the seasons.*

*It is a typical North African phenomenon.*

*This paper is focused on the 2,300 square miles area of the "Chott el Jerid".*

*Some people argue that where now is a chott once was an ocean.*

*Such a theory is not unanimously shared.*

*However, a chott is perfectly suited to become an inland sea.*

**Chott El Jerid** *is a dried-up lake with a maximum length of about 155 miles and a minimum width of 12.4.*

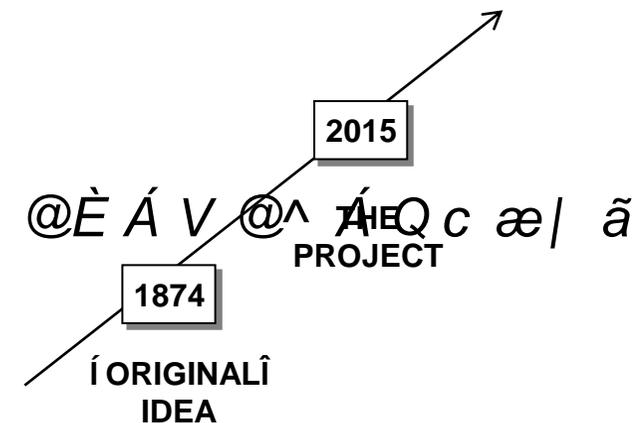
*Its surface is made of salt crystal clusters that provide a rather compact and robust layer, and rests on a bedrock of clay and variably aquifer sands.*

*The salted crust layer becomes thinner when soaked by water, but intense evaporation and wind interaction rapidly dry out the surface.*

*It's the mythical lake Tritonis, accounted for in many legends: sacred lagoon, cradle of epic tales ... a myth well known to ancient writers.*

# Historical background

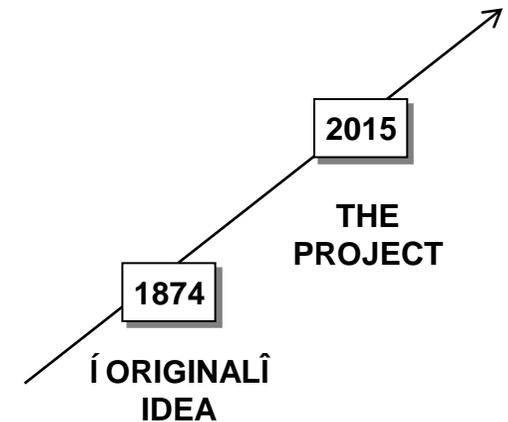
- In 1874, French Army general staff captain Élie Roudaire published a plan for bringing forth an inland sea in Algeria and Tunisia. The project entailed building up a channel to allow ocean water flood the broad North African lowlands, i.e. the chotts. Following the publication a number of expeditions were carried out and also performed a short, yet costly, expedition.
- After Roudaire's death the project was taken over by the developer of the Suez Canal Ferdinand de Lesseps, who was firmly determined to create a sea in the Sahara desert. He believed the enterprise to be fully feasible and bound to have momentous impact.



# Historical background

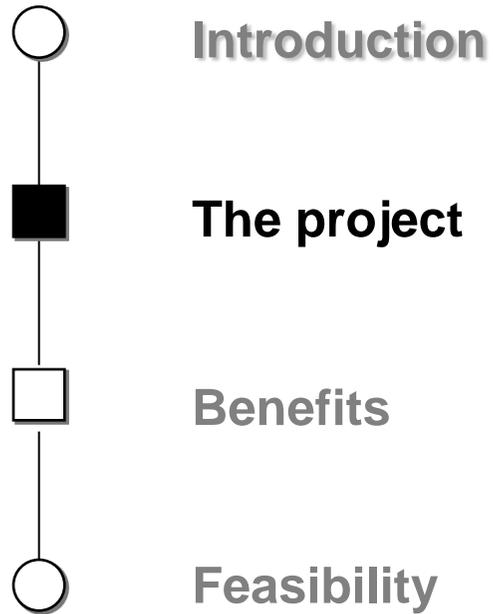
---

- *This grand scheme, however, never kicked off, rather for political than for technical reasons. De Lesseps got dragged into a scandal involving rights granted on the land to be reclaimed...a circumstance that may well be taken as irrefutable evidence of his firm belief in the feasibility of the project.*
- *Since then the chotts have remained unexploited opportunities. Their transformation into inland seas would bring along huge advantages, both during construction and after its completion.*



# Structure of the document

---



# ***The project: purpose and actions***

---

## **PURPOSE**

***The aim is to tackle desertification, unemployment and poverty by creating job opportunities, attracting investments and controlling migration.***

## **STRATEGY**

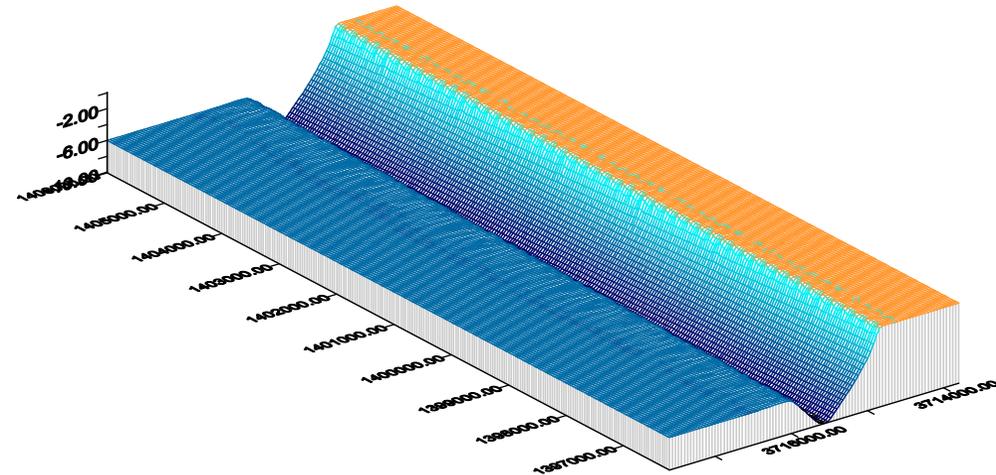
*Flooding Chott El Jerid would create an inland sea in the middle of the Sahara desert.*

## **ACTIONS**

*This is to be achieved by building a canal connecting the north edge of the Gulf of Gabes to the Chott, so as to flood the area and make it navigable. Waters from the canal would pour out into the flatland and flood it to the full. On average the surface of the Chott is at 30 feet below sea-level. Excavating sites would be set up where the surface is not adequately b.s.l. , thus allowing proper flooding of those areas and their suitability for fish-farming, tourism, salt pans, marine labs etc.*

# The project in figures

*The red line in the map highlights the coastline of the Chott, the area that offers the major socio-economic advantages. A 33 feet deep canal would be dug in the sand in order to make the coastline fully navigable.*



*Excavations up to 20 feet deep would be carried out on the remaining areas to endow the artificial sea with an overall adequate depth. The sand from the digging process will be used to create two islands of different sizes in the focal points of the Chott. The islands would be equipped to become seasonal sanctuaries for migrating birds.*

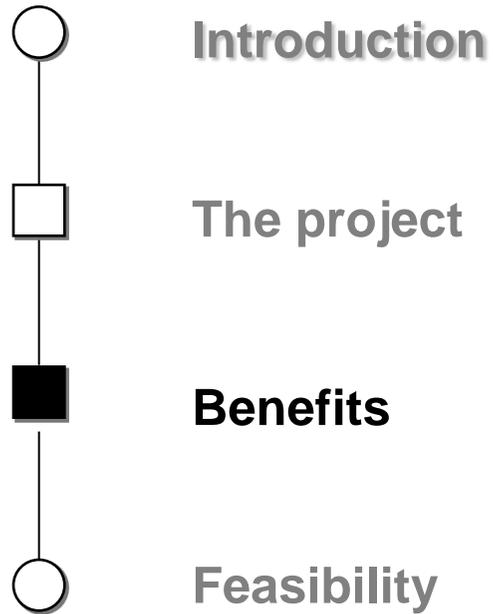
# The project in figures

---

Chott el Jerid area	square miles	2,614
Chott el Jjerid perimeter	miles	340
Coastal strip area (average width: 1.24 mile)	square miles	422
Alongshore navigable canal depth	(meters b.s.l.)	-10
Artificial sea average depth	(meters b.s.l.)	-6
Excavation volumes of alongshore canal	cu.m. / millio	3.234
Excavation volumes of artificial sea	cu.m. / millio	21.489
Earth-moving average distance	miles	5.6
Large island surface	square miles	307
Small island surface	square miles	46
Islands height	(meters a.s.l.)	+25

# Structure of the document

---



# ***The construction site: increasing local employment***

---

- *In Tunisia 60% of the population is aged under 30. This means that the potential workforce represents a considerable share of the country's 11 million inhabitants.*
- *The implementation of such a gigantic project would massively draw on manpower. Enterprises of this kind are, by definition, "labour intensive".*
- *One of the aims of this project is to take a "selective" approach to technology when designing the working sites : on one hand, all the best-practice occupational safety measures will be taken; on the other hand, the digging methods would be highly labour-intensive , albeit thoroughly abiding by the highest standards of occupational safety.*

# *The construction site: increasing local employment*

---

- *This approach enables to create a considerable amount of jobs over a long period of time. (Tunisian government figures report high unemployment rates, with a 35% level in the youth range. Actual figures, however, may well be higher, namely in the south of the country). A whole generation of workers could be employed in the execution of this project.*
- *It is also worth noting that a project of this kind may represent an attracting benchmark for development in the whole Maghreb region. The result would be a stronger image of one of the few positive post-Arab-revolution experiences, and could make it harder for fundamentalists to proliferate.*
- *The first positive result, therefore, is **to the benefit of the Tunisian economy**: employment rates will rise, obviously bringing along improvements in the overall social conditions.*

# ***The construction site: regulating migration***

---

- *The establishment of an important economic development centre on the Mediterranean southern coast brings along the opportunity of controlling the quality of migration towards Europe and notably towards Italy.*
- *A construction plan offering thousands of jobs would quite obviously encourage the local workforce to stay on-site rather than expatriate for better life conditions. According to 2003 Italy's national budget, the cost for the 6,400 Tunisian citizens detained in Italian prisons amounted to EUR 5.6 million per week. Although the number of detainees has today fallen to 1,700 , it is worth noting that the figure does not take into account citizens of other Maghreb area countries ...*
- *This project provides for a practical solution to the issue of immigration: rather than cutting-down on the flows (a rather odd and certainly anachronistic intent), focuses on requalifying migration by making Italy attractive to highly-skilled individuals. Welcome engineers, computer scientists and creative minds of all kinds!*

# ***The construction site: regulating migration***

---

- *The EUR 5.6 million posted in the Italian national budget would perfectly cover the weekly cost of employing 46,374 Tunisian workers (based on the local unions minimum wage of TD 211.12 per week)*
- *Moreover, the migration issue should be considered from a dual perspective: the creation of the "Sahara Ocean", while helping reduce migration towards western countries, would also encourage migration towards Tunisia itself.*
- *Thanks to this Italian project Tunisia would turn into a magnet for workforce from all over the Maghreb region, thus speeding up its long since undertaken modernization process.*

# *The advantage of replicability*

---

- *The features of this project make it applicable also to other areas with similar geographical features. In Libya, for example, there is a chott akin to the one in Tunisia. It is worth noting how Libya nowadays represents a crucial geopolitical issue. Captain Roudaire did also take into consideration Chott Merhrir, situated in Algerian ground and neighbouring Chott El Jerid.*
- *Italy has been long striving to gain a significant role on the Mediterranean arena. This project would help the country increasing its credibility and attaining that (alas lately faded away) cultural and economic leadership.*

# The working site: reduction in the social costs of migration

**The cost of a free, socially productive Tunisian worker is 5.5 times lower than that of a Tunisian detenee in Italy**

**(23" vs. 125 ")**



<b>COST OF MAGHREB DETENEES <sup>(1)</sup></b>	
Number of Maghreb citizens detained in Italy	6,400
Daily cost of detenees (EUR)	800,000
Daily cost of detenees (Tunisian Dinar) <sup>(2)</sup>	1,218,962
<b>Overall weekly cost of detenees (Tunisian Dinar = TD) <sup>(2)</sup></b>	<b>8,532,735</b>
<b>CASE A : 6-DAYS WORKING WEEK (48 man/hours)</b>	
Overall weekly cost of detenees (TD)	8,532,735
Weekly minimum wage of a Tunisian worker (48 man/hours; value inTD) <sup>(3)</sup>	212
<b>TOTAL N° WEEKLY WAGES covered by overall weekly cost of detenees</b>	<b>40,249</b>
<b>CASE B : 5-DAYS WORKING WEEK (40 man/hours)</b>	
Overall weekly cost of detenees (TD)	8,532,735
Weekly minimum wage of a Tunisian worker (40 man/hours; value inTD) <sup>(3)</sup>	184
<b>TOTAL N° WEEKLY WAGES covered by overall weekly cost of detenees</b>	<b>46,374</b>
<b>CASE C : 6-DAYS WORKING WEEK (48 man/hours) + 15% bonus</b>	
Overall weekly cost of detenees (Tunisian Dinar = TD)	8,532,735
Weekly minimum wage of a Tunisian worker (48 man/hours)+ 15% bonus	244
<b>TOTAL N° WEEKLY WAGES covered by overall weekly cost of detenees</b>	<b>34,999</b>
<b>CASE D : 5-DAYS WORKING WEEK (40 man/hours) + 15% bonus</b>	
Overall weekly cost of detenees (Tunisian Dinar = TD)	8,532,735
Weekly minimum wage of a Tunisian worker (40 man/hours) + 15% bonus	211
<b>TOTAL N° WEEKLY WAGES covered by overall weekly cost of detenees</b>	<b>40,325</b>
<sup>(1)</sup> Source: 2003 accounts report of Italy's Ministry of Justice - Prisons Administration Department	
<sup>(2)</sup> exchange rate: 1 EUR = 1.52 Tunisian Dinar as of June 22, 2004	
<sup>(3)</sup> Source: SMIG; Decree N° 2003-1691 of August 18, 2003	

# *The inland sea: a brake on desertification*

---

- *2,300 square miles of ocean do create a microclimate. Upon completion of the project, the area could effectively hinder the developing threat of desertification.*
- *Evaporating waters would trigger rainfall cycles, and the soil - already apt for cattle breeding - over time would become more fertile.*
- *This transformation would have positive impact on both the economy and the society: a flywheel effect on the "new deal" of the area, boosting new jobs and estate development opportunities.*

# *The inland sea: farming, forestry and cattle breeding*

---

- *The result would be a new region of some 3,300 square miles, built around an inland sea and communicating with the Mediterranean. A less arid area where soil and water could be used to kick-start tourism, fish farming, cattle breeding and salt pans, all activities that at present the dryness of the land prevent from developing.*
- *The climate change would make it possible to farm the coastal lands all around the Chott, where there would be a humid climate almost all-year-round. The extent of cultivable areas would have a strong impact on employment and, most importantly, give rise to a new generation of farmers.*
- *The initial cattle breeding could start up even before the natural, full enrichment of the soil: plants that thrive on salt water would be grown in broad patches along the coast of the Chott. Originally from Japan, some of them are specifically raised for cattle-feeding use.*

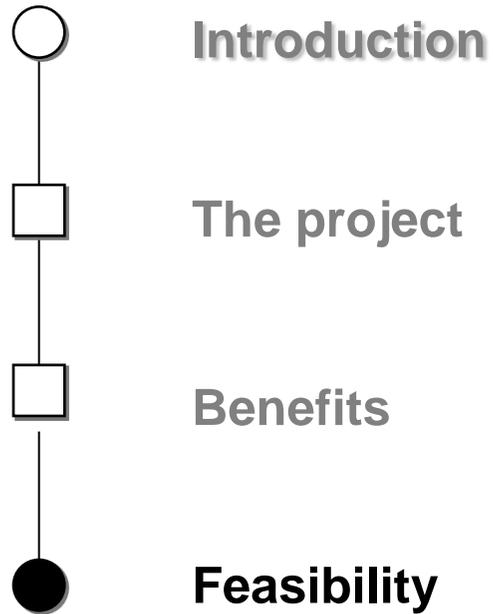
# ***The inland sea: tourism and real estate development***

---

- *Tunisia is a strongly tourism-oriented country. This industry alone adds up to 20% of the country's revenues. The three top countries of origin of tourists are France, Germany and the U.K.*
- *The two opposite edges of the Chott - namely Gabes and Tozeur - are already sought-after destinations.*
- *The establishment of the inland sea would boost a remarkable development of the tourist accommodation industry in the whole area.*
- *Wide shores would be fully dedicated to house hotels, resorts and marinas. The particularly favourable climate - warmer than on the Mediterranean coast - would allow touristic exploitation all-year-round.*
- ***This is the most striking aspect of the whole project. Medium and long-term job opportunities would arise, and international investment capital would flow in.***

# Structure of the document

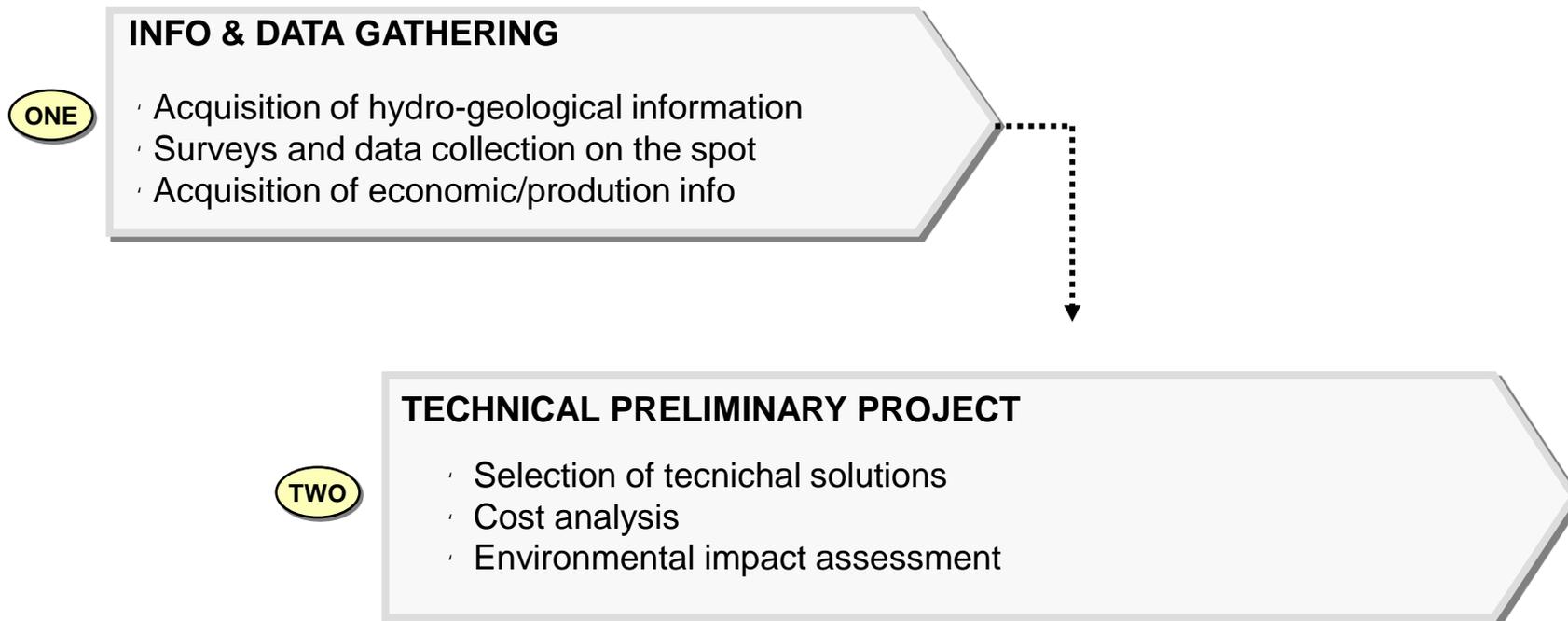
---



# Stages of the feasibility plan

---

*The feasibility plan will be carried -out according to four main stages*



# Stages of the feasibility plan

---

*The feasibility plan will be carried over according to four main stages*

## **PARTNERSHIPS**

- Selection of partners
- Definition of partnership contents
- Negotiation of agreements



## **BUSINESS PLAN AND OVERALL IMPACT**

- Assessment of expected benefits
- Analysis of other venture-linked biz opportunities
- Economic impact analysis
- Draw-up of the venture overall P/L

**FOUR**

## ***Feasibility plan: stage one (data collection)***

---

- ¥ *The aim of stage one, i.e. the analytical basis for the feasibility plan, is to **gather all information needed to draw a precise and effective technical project of the venture, as well as a cost-benefit analysis.***
  
- ¥ *Main activities include:*
  - ***exploring and choosing technical solutions***
  - ***cost assessment***
  - ***environmental impact analysis***
  
- ¥ *Stage one requires a mix of technical, geological and engineering skills.*

# Impact assessment

---

Natural Resources	Biological life	Socioeconomic
<b>SOIL</b>		
1.1 Soil erosion	2.1 Animal life	3.1 Public health
1.2 Soil fertility	2.2 Game	3.2 Use of land
1.3 Soil salinity	2.3 Aquatic life	3.3 Salt mines
1.4 Soil pollution	2.4 Fish	3.4 Tourism & recreation
<b>WATERS</b>	2.5 Eutrophy	3.5 Settlements
1.5 Volume of water	2.6 Plants & shrubs	3.6 New communities
<b>AIR</b>		3.7 Sites of special value
1.6 Gas emissions		3.8 Job opportunities
1.7 Particulate pollution		
1.8 Microclimate		

## ***Feasibility plan: stage two (preliminary project)***

---

- ¥ *The aim of stage two is to design a technical preliminary project of the construction taking to account useful information for the viability assessment.*
- ¥ *Main activities include:*
- ***gathering of geological data***, i.e. nature of the territory, ecosystem characteristics, possible environmental risks;
  - ***surveys and data collection on the spot***, to be performed by ad hoc expeditions making use of the appropriate technical equipment;
  - ***gathering of "local" information*** - production system, availability of specialized and non-specialized workforce, economic framework, regulatory constraints, production processes.
- ¥ *Stage two requires a mix of technical, geological, socio-economic and applied research skills.*

## ***Feasibility plan: stage three (partnerships)***

---

- ¥ *The aim of stage three is to explore and choose contents and players of the Italian-Tunisian partnerships, aimed at exploiting all business opportunities ensuing the implementation of the project.*
  
- ¥ *Main activities include:*
  - ***selecting partners***
  - ***fine-tuning partnership contents***
  - ***negotiating agreements***
  
- ¥ *Stage three requires a mix of management, business, and corporate law skills.*

## ***Feasibility plan: stage four (business plan)***

---

- ¥ *The aim of stage four is to **lay out the business plan of the venture**, taking into account both the cost analysis of stage one and the perspective benefits to be generated by the venture.*
  
- ¥ *Main activities include:*
  - **assessing the expected benefits** as well as analyzing further business opportunities linked to the venture
  - **assessing the economic impact**
  - **drawing up the overall profit and loss account of the venture**
  
- ¥ *Stage four requires a mix of macro-economic, business management and marketing skills.*