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Integrated Ecological and Socio-Economic Evaluation of Reforestation Programs in Souk Ahras (Algeria)

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Abstract
The current situation of Algerian forests, which have played an important and worrying role at the sametime, is a great challengefor us.This study, which was carried out inSouk Ahras,deals withthis phenomenon by emphasizing the main factors of degradation. Moreover, the main problem for the various actors in this field is the absence of a quantitative and qualitative evaluation of thereforestation operations in the wilaya of Souk Ahras. An evaluation based on an environmental and socio-economic approach is a essential component in the development of a reforestation strategy inthis area, which is deteriorating and constitutes a basic tool that can guide the various operators, particularly in the field of firefighting. Through this study, we have attempted to establish a diagnosis that enabled us to identify thecauses of failureand thesources of obstacles, and to identify thefactors that contribute to success Technical and regulatory guidelines allow us to choose a new approach to reforestation within the framework of sustainable development.
Key words: *Reforestation, Balance Sheet, Approach of reforestation, Souk Ahras, Sustainable development*

INTRODUCTION

The Mediterranean Forest is a very complex environment that evolves according to multiple factors, such as climate, geomorphology, soils, hydrology and land use. Today's forest landscapes are the result of the progressive impact of anthropogenic influences (FAO, 2018).

The reforestation carried out in Algeria was carried out as soon as independence took place, as part of the popular worksites, the three-year, four-year and annual plans (Letreuch-Belarouci, 1991). Since 2000, they have been part of the implementation of the national reforestation plan examined and adopted by the Government Council on 26 September 1999.

The National Reforestation Plan reflects the country's forestry concerns, and also aims to integrate as much as possible the ecological and social dimensions assigned to the forest.

Its action is in line with the orientations of the National Plan for Agricultural and Rural Development in terms of the development of mountain agriculture, land reclamation, the fight against desertification, and the protection and enhancement of natural resources in the context of sustainable development (BNEDER, 2009).

This is how the PNR was initiated with the objective of the emergence of viable economic systems that allow rural populations to have adequate means of subsistence, stability and development.

Also, it is useful to remember that the afforestation rate is estimated at 11%, which is why it is proposed through the implementation of the PNR to raise this rate to 13%.

The Algerian Forest is part of this complex, its importance appears in maintaining the ecological, climatic and socio-economic balance of different regions of the country. The intense degradation of these forest massifs ranks Algeria as the weakest link in the Mediterranean basin.

This state of affairs has led our forests on the path of progressive degradation, their meagre silvicultural heritage is gradually disappearing, the forest formations are being transformed and giving rise to new forms characterizing their stages of degradation designated by different names, namely matorrals, maquis, garrigue... etc (Anonymous, 2000)..

In recent years, the Souk Ahras forest has undergone very strong degradation caused by several factors in which man remained the predominant player (Chapuis, 2005).

To rehabilitate and preserve this forest heritage and to integrate the local population into these operations, several development programmes have been set up, such as the national reforestation plan (FOSA, 2000).

For example, the conservation of the forests of the wilaya of Souk Ahras has undertaken several operations to redevelop and enhance the cork oak forests and the protection of the forest heritage. These operations involve the intensification of reforestation campaigns to replace the hundreds of hectares of forest devastated

by fires in recent years.
As part of the development and protection of forest areas, 960 km of tracks have been developed and opened, young seedlings have been maintained over an area of 500 ha, torrential correction works have been carried out with a volume of 3000 m3, 20 water sources have been developed and prickly pear seedlings have been planted on 30 ha. These forests form a beautiful green cover composed mainly of stands of oak and cypress, while in the southern part of the wilaya rosemary, harmal, esparto grass and juniper dominate. These forests cover 22% of the area of the wilaya of Souk Ahras and consist of 43,625 ha of Aleppo pine, 23,431 ha of cork oak and 21,878 ha of holm oak, eucalyptus and scrub. The same program also focused on the execution of various actions including the development of spaces between cork oak trees, especially those that have not yet reached the production phase, in addition to the opening of tracks, the digging of trenches to protect these trees against fire and the planting of several species of trees.
The lack of work and studies on this kind of theme as well as the aggravation of the risk of degradation has aroused our interest in studying reforestation by taking stock of its ecological and socio-economic importance in the Souk Ahras region. This study is therefore part of a general framework for evaluating reforestation, management and development of the forest areas in the study area.

MATERIALS AND METHODS

Presentation of the study area

Our study was carried out in the wilaya of Souk-Ahras, which is located in the north-east of Algeria. It is bounded: to the north-east by the wilaya of El Tarf; to the north-west by the wilaya of Guelma; to the south by the wilaya of Tébessa; to the south-west by the wilaya of Oum El Bouaghi and to the east by Tunisia. It occupies a total area of 812 km² and covers an area of 4360 km², so represents 0.18% of the area of Algeria. It sits in a basin, surrounded by mountains with complex mountainous relief (500 to 1400 m), part of the Tellian Atlas to the north and the High Plains to the south (C.F.S.A, 2023).

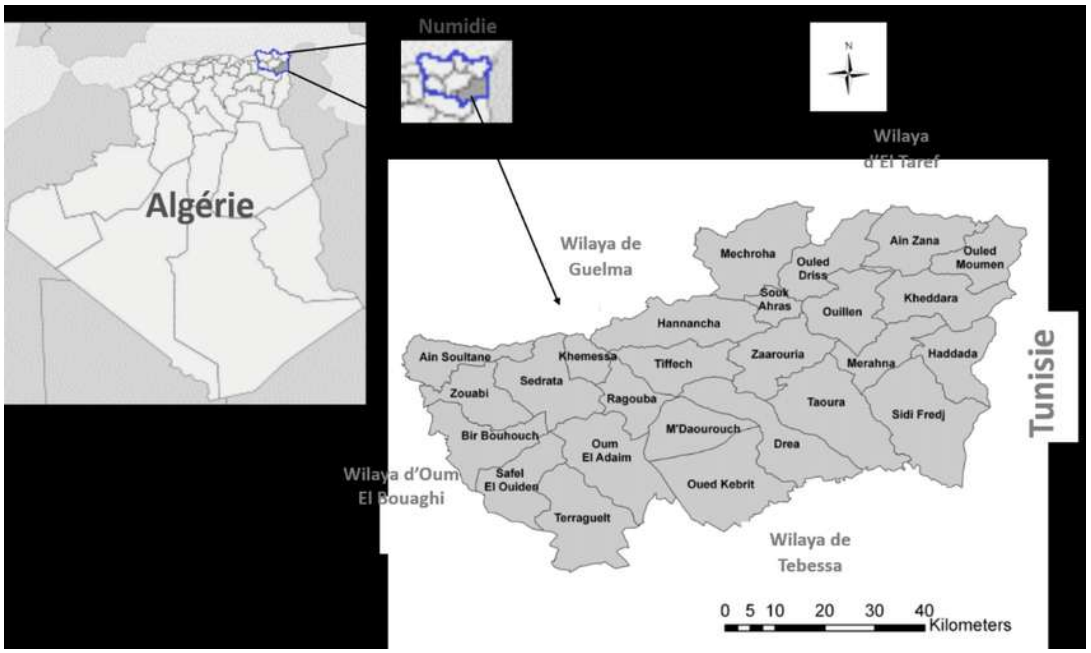

Figure 1: Geographical location of the Wilaya of Souk-Ahras (C.F.S.A, 2023)

The wilaya of Souk-Ahras, located between the Tellian Atlas to the north and the high plains to the south, is subject to a Mediterranean climate in the north and a desert climate in the south. Summer is hot and dry, with temperatures ranging from 25 to 35°C, while winter is cold and wet, with temperatures ranging from 1 to 15°C. Annual rainfall in the north is 650 mm, with a regular distribution, while in the south it varies between 350 and 600 mm. The relief of the region is varied, with mountains in the north and agricultural plains in the south. The flora includes cork oak and zeen oak forests, while the fauna is home to species such as Muscovy deer, wild boar and many birds of prey.
The average annual temperature in Souk-Ahras is 20.79°C, and rainfall varies, with a peak in December. The prevailing winds are northwest during the rainy season and southeast in summer, bringing high temperatures and sand. The region is classified as subhumid to temperate winter according to the rain-thermal quotient.

The wilaya benefits from a hydraulic network with several dams in operation or planned. The forest cover, dominated by Aleppo pine and cork oak, has been affected by fires, although the situation is improving. From a socio-economic point of view, agriculture is a pillar with a focus on livestock and grain production. Tourism is also promising, thanks to the natural and historical riches of the region, while industry is developing, especially in agri-food processing and cork production. The craft is distinguished by the manufacture of traditional soap, cheese and cork products, providing local economic opportunities.

Methodology adopted

The evaluation of the reforestation balance and the analysis of its ecological and socio-economic impact requires two phases of work based on two methodological approaches:

✓ ***Theoreticalapproach***

This approach consists of collecting the data and references necessary to better clarify the current state of the forests and the reforestation operations carried out in the region, as well as the desirable prospects with the collaboration of the various national and local actors (C. F. Souk Ahras, Constituencies, etc.).

✓ ***Practicalapproach***

This approach was carried out by:

Direct and in-depth observation of the targeted sites to make a technical diagnosis and a detailed description of the state of reforestation.

An investigation that includes on the one hand the local population living near the forest and on the other hand the forest managers.

✓ ***Choice of sites***

Because of the short duration of the investigation and taking the direct link between the degradation of the forest massif and the fire factor, we therefore chose two areas: The Machrouha area and the Oued Kebarite area.

✓ ***Investigations***

To carry out our surveys, we opted for the semi-directive method as the basis for our interviews. This type of method allows the interviewee to address themes and sub-themes that the interviewer openly proposes to him or that he or she addresses himself (Treppoz and Vais; 1988). In this case, the questions asked follow one another according to the information provided by the interviewee. During our investigation, we therefore considered it useful to go through formal surveys based on a structured questionnaire, in order to assess the situation. The topics coveredmainly relate to:

- Forest exploitation methods.
- The causes of degradation of the forest ecosystem.
- The development programmes issued and the role of the population in maintaining them.
- Forest resource management and the problems encountered.
- The measures envisaged once the reforestation is carried out.
- The prospects for reforestation.

RESULT

In order to better understand the problem of reforestation in our study area and to know the different actors involved in the preservation of the forest cover, and their contribution at the local and/or national level on the environmental, social and economic levels, as well as the important role played by the residents of the region in the success of the development plan.

In this chapter, we have made the diagnosis through some forty surveys conducted in this field. In order to focus mainly on the identification of reforested sites and the constraints to which they are exposed.

a. Description of the sites

✓ ***The mashrouha zone***

Machrouha is located in the north of the province of Souk Ahras, the district has been located since 1991 at 18 km from the capital of the latter. The commune of Machrouha is characterized by a very rugged terrain. Land, the city is crisscrossed by a hydrographic network of mainly temporary rivers.

The commune of Machrouha is characterized by two periods: the first is cold and wet.

The region is characterized by a mild climate and variable temperatures.

In general, the area is exposed to northwest winds in winter and south and southeast winds in summer.

This area has a varied forest cover, the dominant species being cork oak with an area of about 135 hectares and chestnut with an area of 20 hectares.

The fauna sheltered by this environment, such as the hare, the rabbit, and a rich avifauna such as the eagle

and the partridge.

Figure 2: Mashrouha area

The area of Oued Kebarite

The commune of Oued Keberit is located at the end of the high plains region characterized by an arid steppe landscape, this region is made up of high glacis with an average slope of 5% and a largely undulating relief. As the area is a basin surrounded by mountains, it is characterized by a harsh climate that is very hot in summer and cold in winter. This area has a varied forest cover, the dominant species being the Aleppo pine with an area of 50 ha.

Figure 3: The Oued Kebarite area

b. Results of the questionnaire

In order to obtain clear and precise results, we conducted a survey by carrying out questionnaires near the reforested sites. These questionnaires affect the local population of the area, and local stakeholders mainly represented by the forestry services through interviews granted by various managers.

Population

Profile of the interviewees

In this section, we interviewed 30 randomly selected individuals to ensure their representativeness and to target all population groups (gender, occupation, and education). The population concerned is presented in the following table.

Table 1: Profile of the population questioned

	Gender			Function		Level of education		
	F	H	Seasonal	Employee	Unemployed	Good	Fair	Bottom
<20	-	3	1	2	0	1	1	1
20/40	-	4	3	0	1	2	1	1
40/60	-	8	2	5	1	2	3	3
>60	4	11	3	1	11	1	4	10
Total	30	9	8	13	6	9	15	

According to the table, the number of residents under 20 years of age is low, equivalent to 10%; compared to the other age groups that present a certain equality (about 30%), as well as to the population over the age of 40, 62.5%, which allows us to say that the people who frequent the forest are mostly the oldest.
The table also shows that the majority of the surveyed population is male, at a rate of 87.5%. As such, it can be said that movements in the jungle are generally carried out by men.
The unemployment rate is high, reaching (35%), seasonal workers employing 50%, which seems very consistent with the agricultural activities of the region, which is the only factor that provides them with work in the region.
As for the level of education, we can say that it is modest, that is to say that 55% of the population has a low level and 25% an acceptable level, which gives them a certain lack of knowledge and difficulty in knowing the importance of preserving the forest and its important role in our lives.

Outcomes of the proposed questions

It can be concluded from the previous results that the main reason for the movement of the population in the forest is the harvesting of non-timber forest products (40%), recreation (25%) in the foreground. Grazing and harvesting (15%) in the background in order to. All this to satisfy vital needs on the one hand, and because of the negligence, or even ignorance of the applicable forestry legislation.
This confirms the misuse of forest resources (45%). The travel rate is around (39%) spread throughout the year, with the busiest days being public holidays and weekends. In winter, travel is rarer.
60% of the sampled population says that the main cause of forest degradation is fire. This reflects the state of degradation of the forests where the maquis is the dominant structure of the study area. Grazing remains more or less moderate.
We also note that the sectors that are most frequently responded to when integrating the population into development programmes are the monitored arboriculture and finally goat farming.
71% of the population believe that integration projects have not achieved the desired objectives.

Table 2: Classification of responses to the population-based questionnaire

That	Has	B	C	D	YES	NO
Q: 01	15%	20%	40%	25%	-	-
Q: 02	20%	10%	31%	39%	-	-
Q: 03	25%	33,4%	37,6%	-	-	-
Q: 04	25%	30%	45%	-	-	-
Q: 05	60%	22,5%	12,5%	5%	-	-
Q: 06	44,4%	55,6%	-	-	-	-
Q: 07	75%	17,5%	7,5%	-	-	-
Q: 08	-	-	-	-	61,5%	38,5%
Q: 09	-	-	-	-	72,5%	27,5%

Q: 10	-	-	-	-	52,5%	47,5%
Q: 11	-	-	-	-	29%	71%
Q: 12	-	-	-	-	62,5%	37,5%

Manager

In this section, we had contacts with fourteen (14) forest sector managers at several levels and in different forest management structures. The information gathered through the questions asked is presented below.

- Reforestation projects always have a protection and conservation aspect, this is part of sustainable forest management, but once reforestation is carried out, maintenance measures such as forest planting and various felling operations are necessary for the success and conservation of the subjects.
- Firefighting requires a well-organized forest infrastructure, without neglecting the education of the population.
- According to the managers, the population has been sufficiently integrated into development programmes, which has led to better protection of forests in general and reforestation in particular.

Table 3: Summary table of managers' responses

	Has	B	YES	NO
Question 01	66,66%	33,34%	-	-
Question 02	-	-	78,29 %	21,71 %
Question 03	55%	45%	-	-
Question 04	-	-	53 %	47%
Question 05	13,34%	86,66%	-	-
Question 06	-	-	93,33%	6,66%
Question 07	-	-	60%	40%

c. Critical analysis of the reforestation plan in the study area

Due to the unavailability of some data, we have been forced to present only the years for which we have figures, in order to allow a comparison.

Impact of fires

Fire is the predominant factor in the degradation of the forest massif of the Souk Ahras region. During the period 2008-2018, we recorded a total burned area of 5025.8 ha for 889 fires.

The forest is the plant formation that has been the most affected by the fires with 2856.15 ha, a rate of 57.08%. This can be explained by the density and sensitivity of the vegetation cover of the forests of northern Algeria of the Mediterranean type, characterized by a great fragility and particular sensitivity to fires due to flammable and highly pyrophilic material (coniferous, very dense undergrowth, etc.

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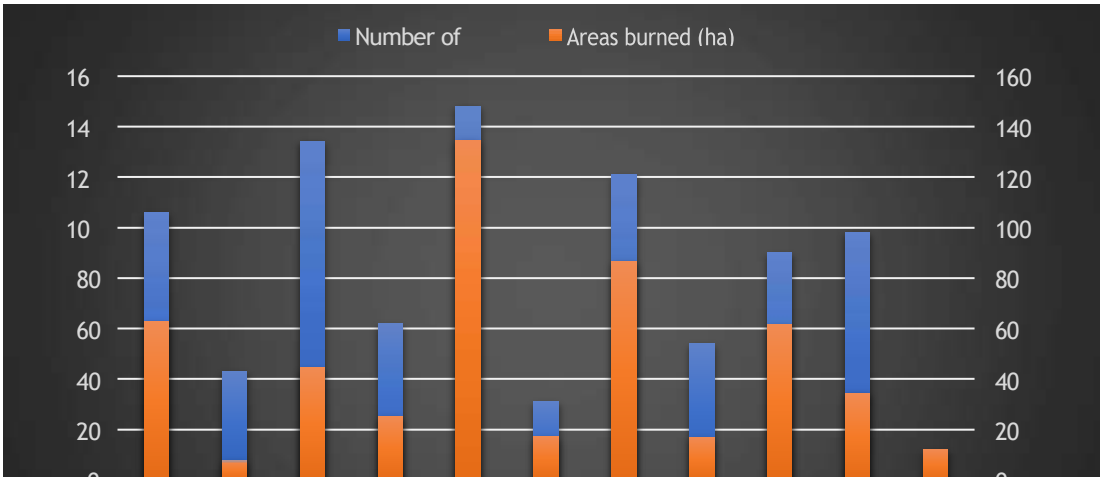

Figure 4: Reforestation burned in the study area (2008 – 2018)

Reforestation success rate by area

Machrouha area

According to the available data, the years 2010, 2012, 2013 and 2016 are based.

The reforestation carried out in 2016 shows satisfactory results, namely 75% success. The other years have low success rates.

Kebarite wadi area

For the Oued Kebarite area, the success rates of reforestation carried out from 2010 to 2013 remain insignificant. For the year 2016, there is a success rate of 50%.

The species used

The process of selecting species for reforestation is very important. And depending on the main factors of the environment (climate, soil, topography), the environmental conditions
must also be suitable for the requirements of the selected species, to ensure the proper development of the forest seedlings (C.F.S.A, 2023).

Table 4: Areas reforested by species from 2011 to 2022

The Species	Pine of Aleppo	oak Cork	Oak Zeen	Cypress	Eucalyptus	Cedar	Empty Ploughable
Reforested area in Ha	43625	14351	6854	2380	500	300	1,052

According to the table, the largest forest area is granted to Aleppo Pine with 43625 ha, then comes cork oak with more than 14351 ha, followed by Zen oak species with 6854 ha, and cypress, with an area of 2380 ha followed by Eucalyptus species with an area of 500 ha and cedar with 300 ha.

Typology of reforestation in the Souk Ahras region

According to the Souk Ahras Forest Conservation, reforestation is classified into three categories in this region:

- ***Reforestation for production***

Represented by maquis and bare land with high production potential, depending on the environmental conditions (climate and soil) and local socio-economic conditions. It consists of:

- A reconstitution or rehabilitation of production forest massifs (filling in voids, clearings and maquis inside the forests).
- Reforestation of the maquis resulting from the degradation of the cork oak forest (reintroduction of the cork oak into its natural range).
- A plantation of homogeneous entities of significant areas to be chosen according to the legal nature of the land and the occupation of the land.
- An extension of existing forests, to guarantee the sustainability of the stands for exploitation.

- ***Protective reforestation***

Concerns bare land, rangeland with low protective cover, and/or marginal cropland to be converted into forest due to either steep slopes or erosion or susceptibility to erosion and because of its location upstream of structures or infrastructures (road and dam), or agricultural land to be protected against siltation, erosion and flooding.

- ***Reforestation for recreation***

Intended for the creation of a shade and green environment on the outskirts of urban areas. It is carried out with ornamental species and is accompanied by the establishment of the necessary infrastructure for

the reception of the public (leisure).

- ***Distribution of plantations***

Plantations in the Souk Ahras region take place in various contexts, but the "Protection" remains dominant in all the initiatives undertaken.

- Hemmama State Forest: 9,403 ha.
- Boussessou State Forest: 5,502 ha.
- Oued Mellegue State Forest: 3,597 ha.
- Sellaoua State Forest: 3,010 ha.
- Ain Klib State Forest: 2,943 ha.

Reforestation is defined as an operation that aims to restore or create wooded areas or forests that have disappeared as a result of various degradation factors (fires, parasitic attacks, anthropogenic actions, etc.).
Our study area is a typical case of this definition where more than 2000 ha are intended for this purpose. The other operations consist of reconstituting degraded and fragile environments (repopulation) such as the maquis (1270 ha) or carrying out D.R.S. works such as the fixing of the banks (70 ha).

The nursery as a main player in reforestation

The nursery is a main link in the reforestation operations, the seat of birth and development of forest seedlings, the nursery must provide the necessary conditions for the proper development of the species before being transplanted elsewhere

Current management and development of the forest domain

- ✓ ***PPDRI***

The PPDRIs are considered a direct response to the economic, social and political crisis that had hit the Algerian economy and society throughout the nineties. They are also an institutional complement and a legal instrument to the PNDA, set up by the Instruction of the Head of Government (2008) on the consolidation of the rural renewal support program for the five-year period 2010-2014 (Aouiche-Chenoune, 2017).
According to the scheme defined by M.A.D.R, PPDRI projects are integrated unifying projects built "from the bottom up" in the responsibility shared between local government services, local elected officials, citizens and rural organizations.
They federate the objectives of the State's programmes, and synergize existing sectoral policies, to support the territorial dynamic in a sustainable, economically viable and socially acceptable process.
The PPDRI Project is any project comprising actions to support populations and institutions in rural areas acting to achieve a common objective (unifying theme) in order to:
Unifying theme 1: Improving the conditions and quality of life of the population through the rehabilitation of villages and K'sours, the promotion of socio-economic and cultural infrastructures and facilities for collective use;
Unifying theme 2: Increase and diversify the income of the population through the promotion of small and medium-sized enterprises in the production of goods and services as well as pluriactivity
Unifying theme 3: Developing and sustainably managing natural resources
Unifying theme 4: Protecting and enhancing tangible and intangible heritage

PPDRI project design

Initiation and definition of the territory

According to the scheme developed by M.A.D.R (2006), the initiation of the PPDRI project stems from a local idea of individuals, households, the communal people's assembly or the decentralized administration. This proposal, which reflects the wishes of the people concerned by development, is expressed to local actors in order to mobilize the necessary resources for the formulation of the project.

Preparation of the project by the municipal rural animation unit

The PPDRI consists of translating the priority concerns of the rural communities concerned into an action programme accompanied by a plan to finance both individual and collective investments necessary to meet the social and economic objectives of the community (Semmache, 2015).
The preparation of the RDPP consists of:

- Set up the project team: Facilitator and facilitator. The facilitator is appointed by the population or the APC concerned, the facilitator by the Head of the Daïra within the communal rural animation unit.
- Gather all the information: Characterizing the territory and to identify the main lines of the future project.

Group survey and household survey

This phase, which takes place in the form of discussion and prospecting of the field, will make it possible to

define the state of play of the territory concerned: the problems, strengths, weaknesses, expectations of people, economic, environmental and social issues in order to establish the axes of progress (Akerkar, 2015). The household survey is carried out by the facilitator(s), supported by the project facilitators, among all households in the territory involved in the PPDRI. It is a question of identifying each actor in the project in his or her capacity as an individual project leader.

Formulation of the IRPP

The previous stages should facilitate the formulation of the PPDR, which should lead to the detailed identification of the programme of actions to be carried out, the proposal of the project's financing plan and the identification of the means to be mobilised for its implementation.

Confirmation of the project by the daïra technical committee

After acceptance of the PPDRI by the rural community concerned, the file thus formulated is transmitted by the communal rural animation unit to the secretariat of the Daïra technical committee, which will be responsible for confirming the project, after studying it, enriching it if necessary (Hocine, 2018).

Validation of the project by the wilaya technical committee

According to Hocine (2018), the project file being confirmed, it is presented by the Head of Daïra to the wilaya technical committee which will be in charge of its validation.

Approval of the project by the Wali

The formal approval of the PPDRI by the Wali automatically commits the structures concerned to ensure the financing of the actions from the specific support funds and from the resources of the P.S.D, P.C.D and P.C.D-D.R. Each executive director of a Wilaya is responsible for the implementation of actions within his or her jurisdiction (Bensania, 2012).

The project launch statement

Upon receipt of the PPDRI's approval, the receiving service, the facilitator and the PPDRI facilitator organise an information meeting with the community concerned to declare the launch of the project and initiate the timetable of actions.

The date of the minutes of this meeting shall serve as the date of launch of the project and shall start the 12-month period for carrying out the actions.

Implementation of the action programme

The project owners in charge of PPDRI projects begin the legal and necessary implementation procedures. They supervise and monitor the work and coordinate with the local technical structures concerned.

The acceptance of the work and the service provided

After the completion of the work, the project owner checks the compliance of the project with the specifications and draws up a "certificate of service done" which he sends to the specialized financial institution with an order for payment of the work concerned. The service records of each member are transmitted to the Database Management System (DBMS) by the Project Owner using the liaison sheet.

Payment for work

Upon receipt of the payment order, the approved financial institution shall proceed to pay the invoices and charge these expenses to the project account in the corresponding chapter. It shall report to the relevant Executive Directorate on the payment thus made (date, amount paid, beneficiary of the payment).

Modification of the PPDRI

If necessary, modifications may be made to the project actions for individual or collective use, provided that they do not exceed the amount of the programmeauthorisation or the financial envelope granted to the project.

The closure of the RRPP

It consists of the following stages:

- *The PPDRI end declaration* : draw up a project end declaration and send it to the head of Daïra, as well as to the specialized financial institution for the closure of the project account.
- *Closing the project account* : After receiving the certificate of completion of the project, the specialized financial institution under agreement proceeds with the operations of closing the project account and reports to the project owner.
- *The PPDRI end-of-year survey* : Aims to assess the impact of the project's actions in relation to the initial objectives.

Follow-up - evaluation and control of the PPDRI

According to Laib (2020), project management, impact assessment and monitoring. This phase includes all the operations that make it possible to know the status of the PPDRI and the actions that make it up. It

begins as soon as the PPDRI is approved by the Wali. The Daïra and the Wilaya constitute the two main levels of monitoring and evaluation of the PPDRIs, corresponding to the respective fields of action. The completion of this phase makes it possible to know:

- The state of administrative management and progress of the PPDRI and the files that make it up.
- The physical state of progress of the actions planned in the PPDRI listed on a dashboard.
- The status of commitment of appropriations.
- The status of actual disbursements.

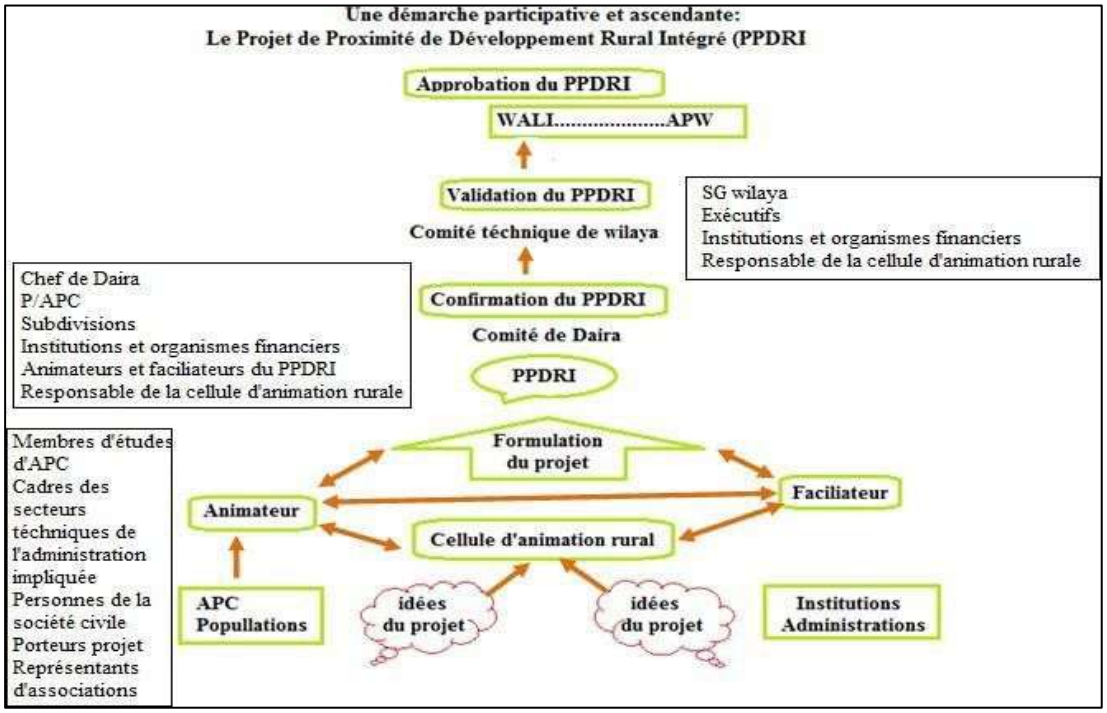

Figure 5: Design diagram of a PPDRI project (M.A.D.R, 2006)

Case of the study area

In the study area, the PPDRi was launched between 2009 and 2014, and is managed through the conservation of the Souk Ahras forests, through various extensions. This is in order to:

- To improve the social and economic conditions of the rural population.
- Integration of the farmer's idea, desire, interests, preparations and abilities for the success of rural development in order to attract the rural population to help preserve forest wealth.

Among the most important rural development projects:

- Opening the way and breaking the isolation
- Digging wells and distributing fruit tree beehives It's for local economic development

Management perspectives

As for the Forest Conservation Department, these projects are very successful for people who are trying to invest in the countryside, because they support the farmer for free.

In the context of the monitoring and evaluation of rural development projects, certain conditions have been added, such as fruit trees, a document proving ownership of the land, a holder of training in the field in which he or she wants to invest, and a simple financial contribution of no more than one third, as part of the monitoring of the success of rural development**.**

General discussion

Due to the considerable area of the forests, namely 96,463 hectares (20.40% of the study area), its fauna and flora diversity, the forest heritage of Souk Ahras plays a key role in its ecological and socio-economic balance. However, it remains exposed to the various threats that have led to the degradation of ecosystems and the deterioration of forest wealth, the main cause of which is undeniably repeated fires.

The main characteristic of this forest is the dominance of Aleppo pine forests (34.50%) over the entire surface of the region, accompanied by some forest species testifying to the previous existence of ancient climax formations, such as cork oak forests and their different stages of degradation.

Several efforts have been made to rehabilitate these fragile environments and consider their extension,

through the creation and implementation of national projects and other sectoral programmes.
Indeed, reforestation and rural development programs have been initiated in Souk Ahras with the aim of preserving the forests and integrating the local riparian population, in order to avoid their isolation and marginalization.
According to the National Reforestation Plan (PNR), the reforested area reached 3,469.4 ha from 2009 to 2014, with an annual average of 385.49 ha.
According to the Souk Ahras Forest Conservation, the 2021-22 reforestation campaign had been used to proceed with the experimental planting of 20 hectares of chestnut trees in the forests of Mechroha, with a success rate of 80%, in addition to the planting of pistachio trees of
The Atlas. For 2020, Souk Ahras planted 20,000 seedlings in the Boussessou forest (Taoura commune). In March 2021, as many as 550,000 trees were planted to replace forest areas destroyed by wood fires.
The major hazard to which these reforestations have been subjected in the last decade is fires, of which nearly 1,014.8 ha have been burned due to the lack of DFCI management.
Fires have a great influence on the success rate of reforestation, in addition there are other factors at play: the high level of anthropization observed for these environments and the random choice of species used, which have contributed to the failure of reforestation operations.
In addition, the insignificant results of reforestation operations must call for scientific reflection and research, in order to be able to solve the problems related to the success rate of reforested seedlings. An adaptation between the ecological requirements of the species and the factors of the environment must be verified.
For example, cork oak plants must be introduced into the open scrub. Shrub and bush species found in these degraded habitats can protect young plants from solar radiation and heat by providing shade during the early stages of this species' development. Although cork oak is a heliophilous species, young seedlings require attenuated light to maintain and develop.
Regarding the adoption of a plan for the prevention and effective fight against fires, as well as the integration of the local population within the framework of participatory management, we have been able to confirm that they are indeed part of the current concerns of foresters, by the initiation of PPDRI projects.
This inventory should encourage local actors to multiply their efforts in future reforestation projects. Above all, they must face a single challenge, which is to ensure the maintenance, extension and sustainability of the forests in the Souk Ahras region.

CONCLUSION

The wilaya of Souk Ahras is a mountainous and forested wilaya, of an agricultural, sylvo-pastoral character. The forest area of the wilaya is estimated at 96,463 hectares, which represents 22% of the total area of the wilaya. These forests are distributed as follows:
On the northern slope of the wilaya, there are cork oak forests across the communes of El Mashrouha, Ouled Idriss and Ain El Zana over an area of 21,205 hectares which are productive forests.
In the southern part of the wilaya, the Aleppo pine forests are spread over vast areas estimated at 43,625 hectares, where these forests are very sensitive to fires and require greater care to preserve them because it is difficult for us to renew them if they have been exposed to two successive fires in a short period of time and are considered protection forests.
Faced with many ever-increasing constraints, the forestry sector has undertaken reforestation operations in various forms, the evaluation of which has always been the subject of our work.
The balance sheet we have drawn up has enabled us to record a total of 3,469.4 ha of reforestation spread over four main types of plantations with an average overall success rate of 15 to 20%, a success rate that varies between 5% and 70% depending on the type and location of the reforestation, which corresponds to the percentage of surviving plants.
The choice of species used, rigorous monitoring of reforestation and the development of silvicultural practices can contribute to the recovery of the current situation. This goes hand in hand with a real policy of prevention and fight against forest fires and the integration of the local population in the region's forest development.
At a time when our country is struggling to position itself economically on an international scale because of the fall in the price of fossil fuels (oil), the use of renewable energies (wood) through sustained forest production is essential. This will be a better alternative in the context of sustainable forest management in Algeria in general and in the Souk Ahras region in particular.

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