



Towards a climate service for the Tunisian tourism industry

Pr. Latifa HENIA and Dr. Zouhaier HLAOUI

Université de Tunis, FSHS, UR « GREVACHOT »

lhenia@yahoo.fr, zouhaierhlaoui@yahoo.fr

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Introduction : Until today's Tunisia, there is little communication between generators of meteorological or climatological data and stakeholders in the tourism sector. However:

- A recent survey shows that professionals in the tourism sector are aware of the importance of integrating relevant climate information in their tourism management and development strategies.

- Tunisia has expertise in the field of meteorology and climatology which meets the demand of the tourism sector in relevant climate information.

The program CLIM RUN has created a framework allowing the introduction of a climate service in the Tunisian tourism sector. It identified the needs of the sector in climate information as well as examined together with specialized services and trained researchers the possibility of responding to these needs. The "GREVACHOT" research unit based at the University of Tunis and partner of the CLIM RUN program has developed one of the products for which great demand was formulated by tourism stakeholders: this is tourism climate comfort index (tci) at regional and local scales.

We present here :

- The Tunisian experience in identifying climate information needs of the tourism sector;

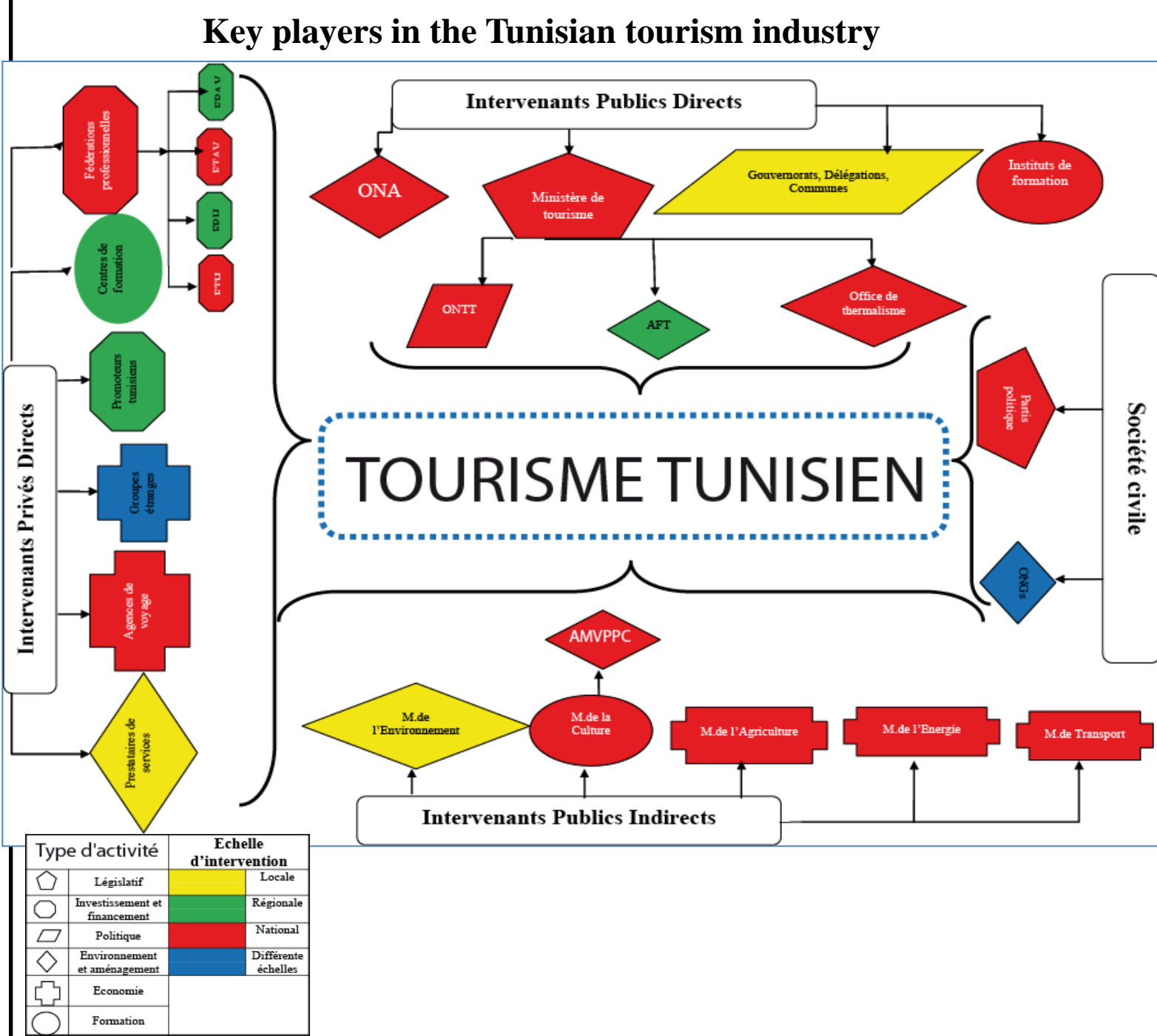
-- The approach method to the development, study, mapping of ICT and results.

I /The Tunisian experience in identifying climate information needs of the tourism sector,

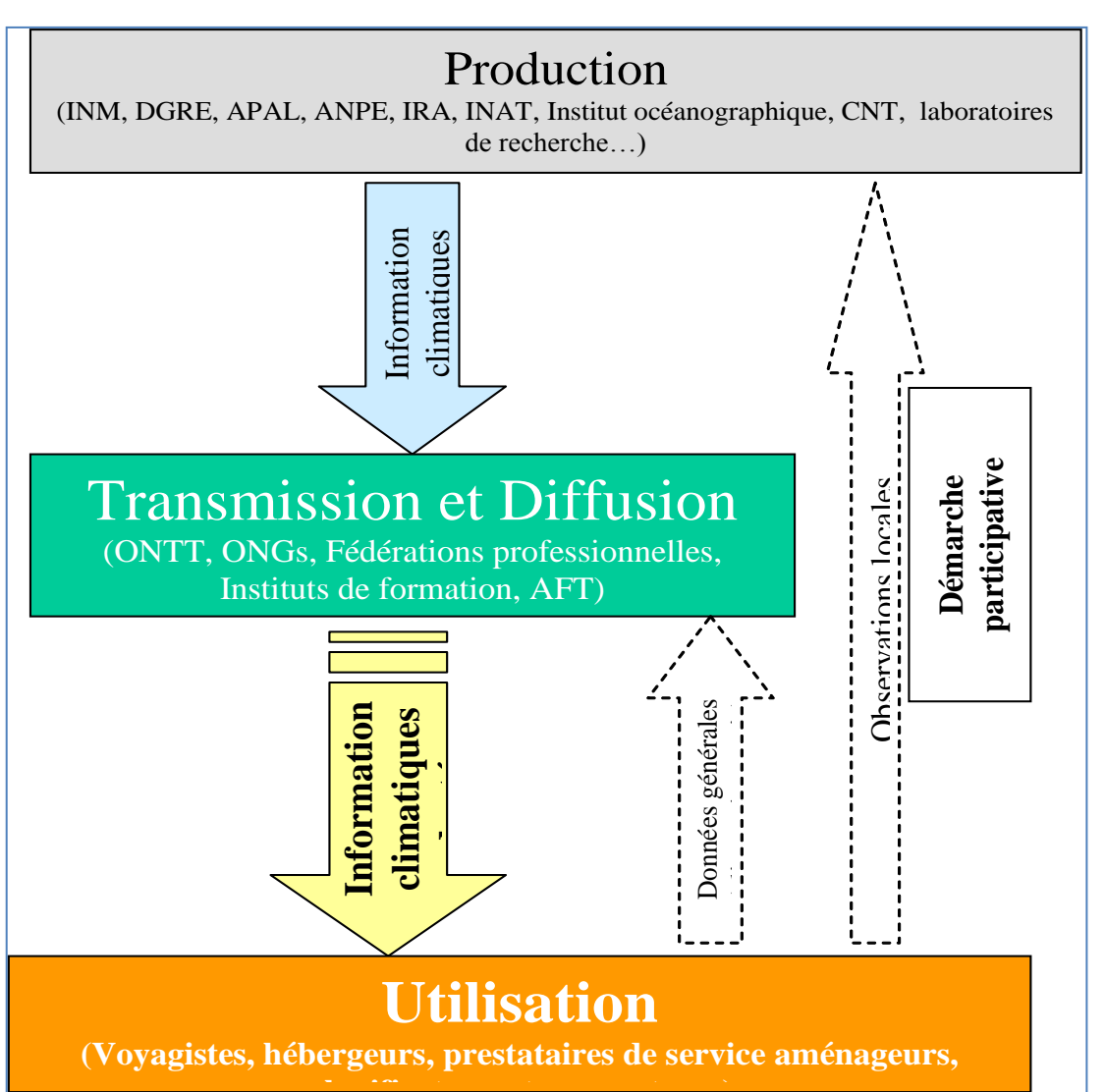
I.1/ Approach

- Stakeholders identification

*Traditional institutional analysis (Key figures / institutional data / tourism and climate governance)



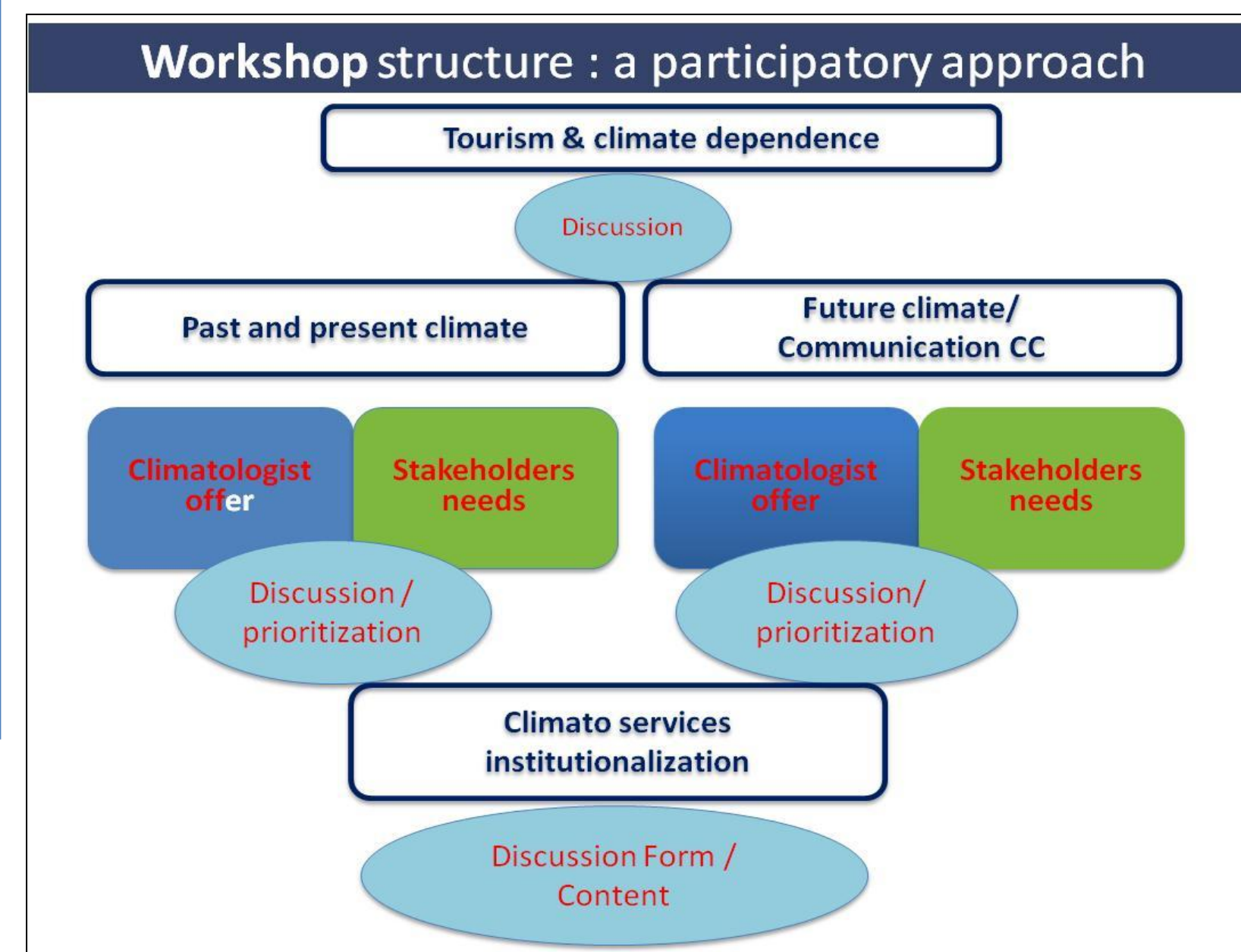
The main actors involved in climate information flow



- Stakeholders involvement , Interviews and Workshop

-Face to Face interviews (short perception questionnaire, a questionnaire articulé turn to 5 axes and each axis is composed of 3 to 8 questions)

-Two workshops (a participatory approach)



I.2/ Main results

- Information needs of the current climate (Table 1):

Table 1: Needs of the stakeholders : present climate information

Product	Parameter	Stakeholders	Activities	Time Scale	Spatial Scale	Product Availability
Understanding of climate tourism	Indices comfort climate-tourism TCI	Travel agents, hoteliers investors developers	All outdoor activities	TCI, across the years, seasons and months computed over a long period	Regional to local	Can be produced by the GREVACHOT
Cost term forecast suitable for outdoor tourism activities	temperature rain Sandstorm	travel agencies specializing in adventure tourism and trekking Northwest and South of Tunisia, nautical activities,	All outdoor activities	48 h. one week	Local	Does not exist today, but can be produced by the MNI, once aware of this.
Medium-term forecast	- Air temperature	Travel Agencies	outdoor activities	One to two months, high Season low Season Peaks during the low season (school holidays, Easter, Christmas)	Regional to local	Data available at the MNI and on websites. Modeling needs to be done
	Rain (Heavy rain and floods)		outdoor activities	One to two months	Regional	Forecast available at the MNI pure ARPEGE-CLIMATE
	Sandstorm	Saharan tourism	one month	Regional to local	Remains to be done	
	Winds and storm	Boating and water sports	one month	Regional to local	Remains to be done	
	sea surface Temperature SST	stakeholders seaside	beach activities	One to two months on the margins of the bathing season	Regional to local	Lack of data near the coast.

- Information needs of the future climate (Table 2)

Table 2: Needs of stakeholders : future climate information

Product	Parameter	Stakeholders	Temporal horizon	Spatial resolution	Temporal resolution	Product Availability
Forecasts of climate change tourism	Air temperature TCI	Planners, investors, travel agencies specializing in adventure tourism and trekking Northwest and Southern Tunisia hosting Saharan	15 to 30 years	Regional and sub-regional and country issues	year seasons	To do by modelers
Scenarios rising sea level following the CC (degradation of beaches)	Changes in sea level near the Tunisian coast	hosting seaside	15 to 50 years	Regional and sub-regional	annual Average trend	that product is not directly climatolog y. Remains to be done by modelers

II/ - The approach method to the development, study, mapping of TCI and results.

II.1 / Climatic preferences of tourists in Tunisia: survey approach

❖ Aims:

- Define an index that is based on the expectations of tourists about climate

- Assess the relative importance of each element of the climate in the perception of climate comfort in the tourist sector

- Evaluate the importance of tourists' personal factors of in the perception of climate and climate comfort.

❖ Methodology tools:

- A questionnaire-based survey on tourists during their stay in Tunisia

- By direct contact

* Application through tourist guides and facilitators (supervised by GREVACHOT climatologists)

* Targeting tourists from different nationalities, age groups, and sexes,

* Target various tourist activities

* Perform investigation in different tourist regions of the country, and during low and high seasons

❖ A questionnaire in two parts:

Part 1: focuses on corporal and mental perception of climate by tourists. This component also aims to define the relative weight of each element of the climate (temperature, wind ...) in the feeling of climate comfort. Part 2: focuses on the effect of climate in the practice of tourist activities including the strengths and climatic constraints for outdoors tourism activities.

The questionnaire in paper form and in a single page.

The questions are of closed-type multiple choice

❖ Sampling

A simple method of quota sampling (by nationality, age, sex, type of outdoor activity ...)

For each phase of the investigation, we relied on a sample of 1,000 tourists, totaling 2000

II.2/ The results of the survey: the key points

* A fairly strong sensitivity of tourists and tourism activities to climate

* Sunshine, humidity and wind come almost equally with temperature in determining the climate comfort for tourists

* The thresholds for assessing the effect of different climatic elements on the level of comfort vary largely depending on the nationality of the tourist, then, depending on the age, gender and type of outdoor activity.

Figure 1: Impact of climate on tourism

(% of respondents by type of activity and level of impact)

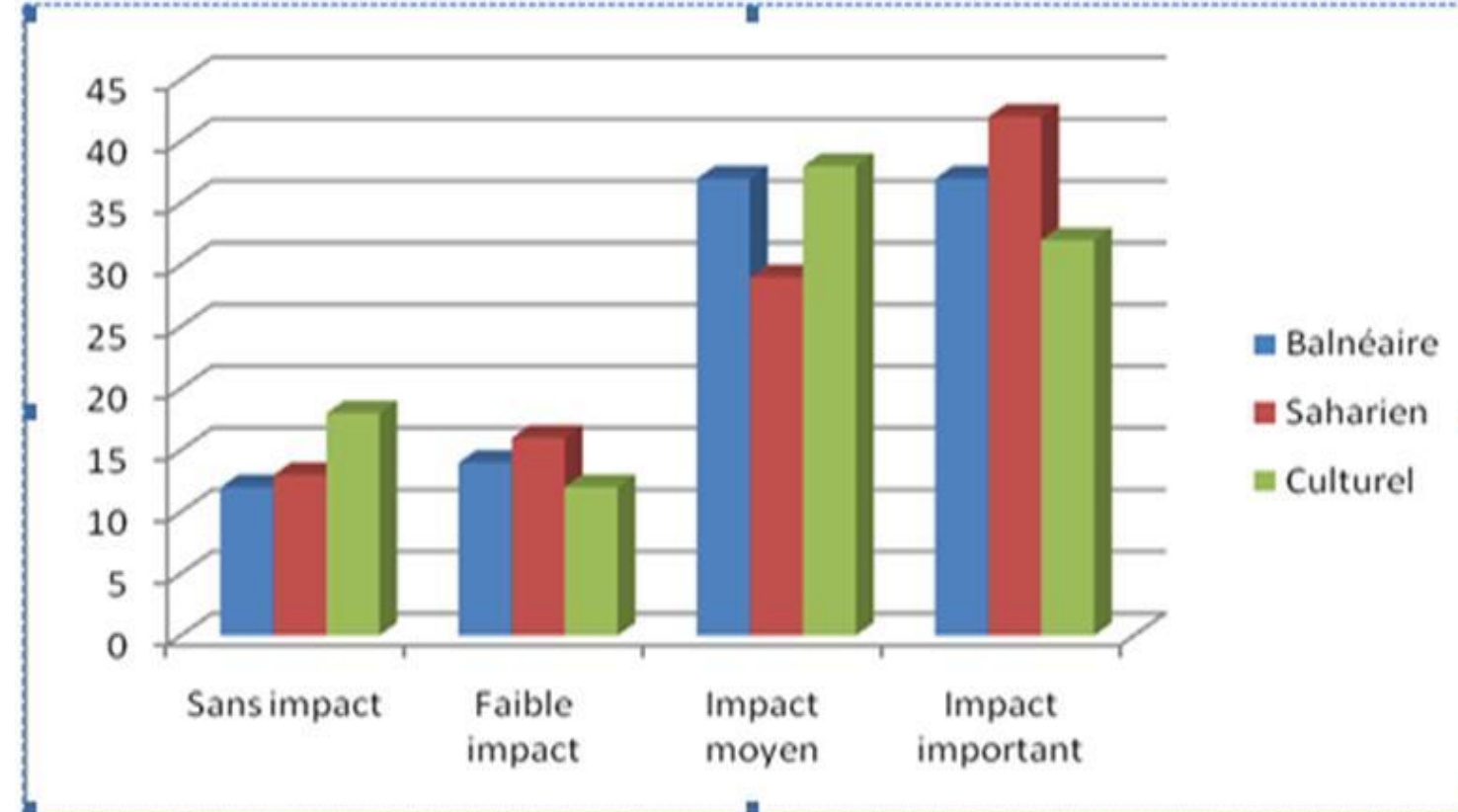


Table: Frequency response of tourists (% of total responses) per ° C temperature classes

	<=0	0 à 5	5 à 10	10 à 15	15 à 20	20 à 25	25 à 30	30 à 35	35 à 40	>40°C
Très froide	62	22	11	5						
Froide	15	32	22	16	13	2				
Moyenne			6	23	27	34	10			
Chaude					1	23	41	27	8	
Très chaude							5	36	26	33

II.3/ TCI. based on survey results

➤Form of the TCI:

The tourism climate comfort index (tci) is the sum of five climatic parameters: temperature, humidity, sunshine, wind and rain.

$$TCI = iT + iS + iH + iV + iP$$

iT = temperature index

iH = the air humidity index (relative humidity)

iS = sunshine index

iV = wind index (wind of sand or strong wind)

iP = rain index.

The index "i" values are coded from 0 (negative), 2 (no impact) or 4 (favorable).

We calculated values and the comfort index for:

➤ Seaside tourism, which requires higher temperatures than other types of tourist activities

➤ Saharan tourism, for which the favorable climatic environment has certain characteristics (no sandstorms, no torrid heat)

➤ An overall index for other outdoor activities (hiking, ecotourism, cultural ...). For this index, we distinguished the diurnal period (three-hourly observations from 9 am to 18 pm) and night time (three hourly observations 21h and 0 h). The comfort index for night time can be used by tourism stakeholders to develop their activities by night, especially in the south of Tunisia. In summer, the torrid heat during the day makes outdoor activities hard.

➤ Main points

❖ The bathing season is long in Tunisia. It exceeds 6 months, with specified variations namely:

- It is particularly long in the south (eg. Djerba)

- The bathing season is much longer for tourists coming from cold countries.

❖ Saharan tourism season: Outside the summer, when it is very hot, the climate of southern Tunisia is very comfortable for Saharan tourism

❖ Predominance of comfortable and very comfortable climate conditions for outdoor activities during both the daytime and night time, with variations according to regions and seasons

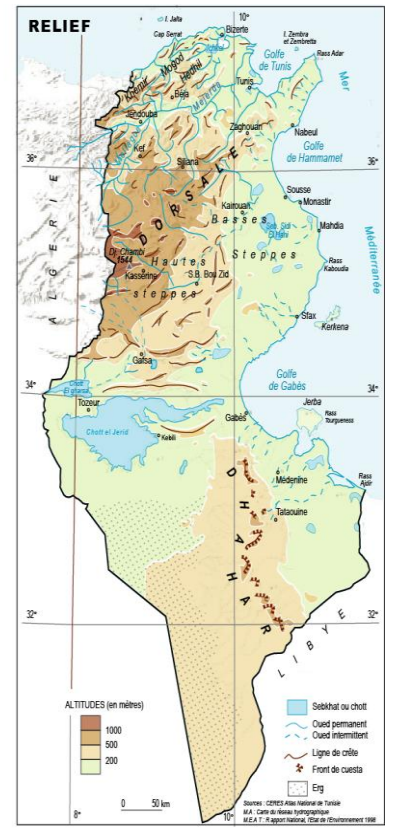
Conclusion:

❖ Tunisia : great climate-tourism potential.

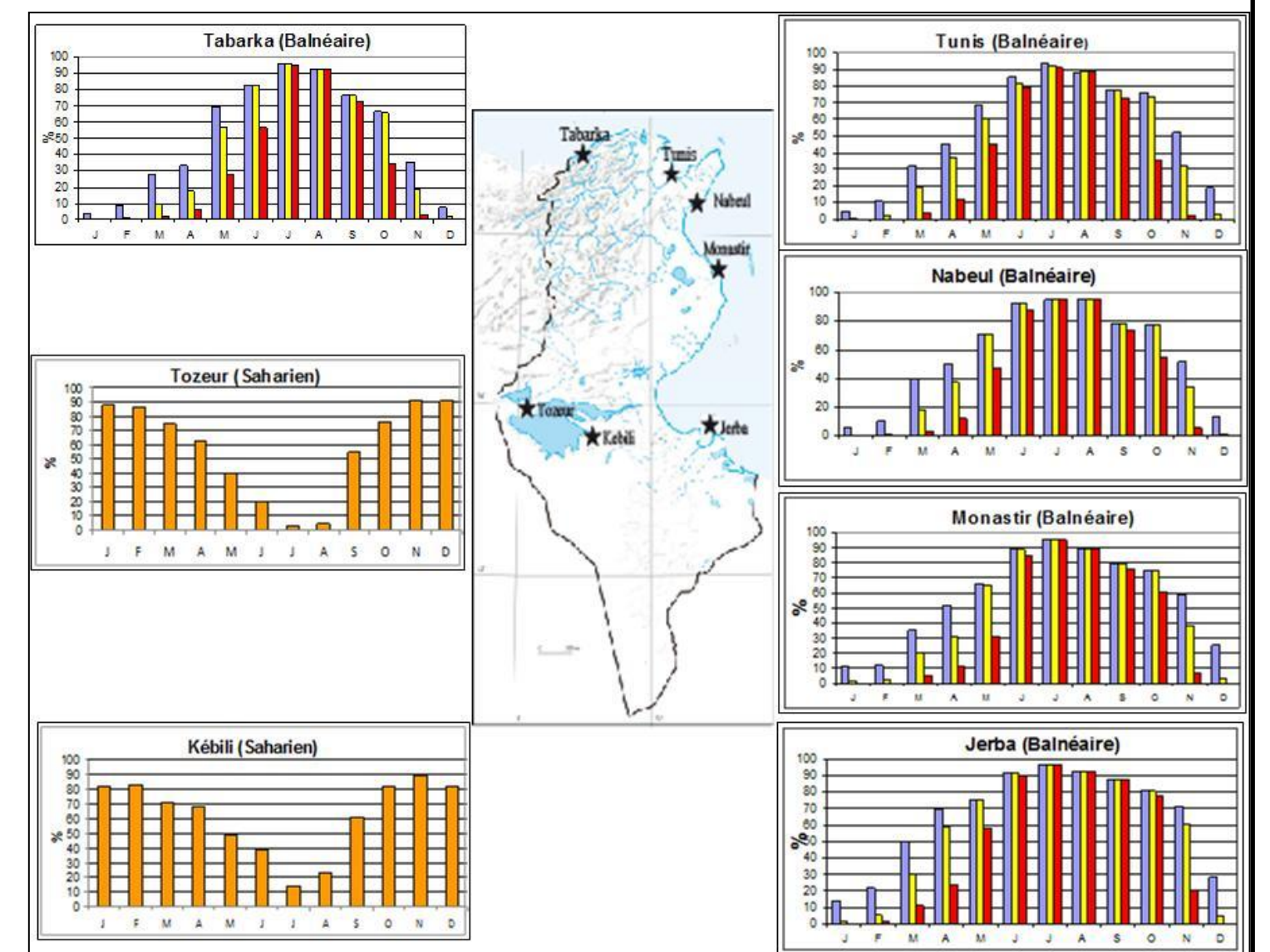
❖ Seasonal and spatial scale variations that can be exploited for the development of other forms of tourism

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Monthly frequencies days comfortable and very comfortable for Saharan tourism and beach tourism



(For the beach, the colors indicate the origin of tourists by country issues)

Monthly frequencies of days and nights favorable and very favorable to the tourism activities outdoors (hiking, cultural tourism, recreation ...)

