

## THE ECONOMIC AND TOURISM DIMENSION OF THE LEATHER AND FOOTWEAR SECTOR IN THE FRAMEWORK OF THE SUSTAINABLE RURAL DEVELOPMENT STRATEGY, DJELFA AS A MODEL

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**Abstract:** The leather sector is one of the most profitable agricultural industries globally and has multiple social, economic and tourism dimensions, as it is linked to the transmission of leather industry traditions through generations in a variety of ways and multiple uses. This paper aims to trace the development of the leather and footwear sector and the transformations that this sector went through during the period from 1974 to 2021. We rely on studying quantitative analysis using various statistical programs such as PCA, SPSS, Excel and EViews and analyzing and deducing their numbers and curves. The results concluded that during the first 25 years of the period studied, which coincided with the adoption of the socialist economy, the leather and footwear sector accounted for 52.1% of the total economic sectors. In the next 23 years of the study period, after Algeria's transition to a market economy, this percentage rose to 57.9%. These findings reflect the pivotal role played by the leather and footwear sector in the Algerian economy since the beginning of the study, and highlight how the transition to a market economy contributes to the growth of this sector, reflecting its ability to adapt to economic changes and take advantage of the opportunities offered by economic openness.

**Keywords:** leather and footwear, handicrafts and tourism, sustainable rural development, Algerian economy, Djelfa province

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### INTRODUCTION

The leather sector in Algeria relies heavily on animal husbandry, mainly sheep, goats, cows, camels, and horses, and the total heads of all species during the period 2000-2009 was about 24.5 million heads, and this number increased to 33.6 million head during the period 2010-2017, with an increase rate of 37%, sheep represent 78% of the total livestock with 26.4 million heads, (MARD). Algeria also has significant natural pastures, especially in the steppe areas between the Saharan Atlas and Talli mountain ranges (Le et al., 2024; Belarbi and Boudier, 2023; Hammouda et al., 2014; Bousbia et al., 2024; Nedjraoui, 2001; Martínez-Valderrama et al., 2018), and most of the population in these areas are famous for raising livestock, and the state has given in this area programs, plans, projects, and strategies in the field of sustainable rural development (Wijijayanti, 2023; Yahia et al., 2021; Sahli, 2010; Laoubi and Yamao, 2012), which prompted The Ministry of Rural Development to identify and formulate priorities at the level of rural, mountainous and even Sahara Desert (Sutrisno et al., 2024; Mwinyihija, 2015; Rafiuddin and Satyanarayana, 2014; Pham et al., 2022).

These programs aim to develop infrastructure and break isolation while making the most of development projects by diversifying sources of national income and providing alternatives to the rentier economy. Algeria is the largest country in Africa and the Arab world in terms of area, amounting to about 2.38 million square kilometers (Rabhi et al., 2023; Nedjraoui, 2001). This has earned it a significant environmental, climatic, and natural diversity that was reflected in the diversity of natural and cultural resources, as customs and traditions vary from one region to another, which made the inhabitants of these areas innovate in traditional industries (Ghediri et al., 2022) each according to his daily needs and according to the availability of raw materials common to nature and climatic conditions, These industries have evolved through the ages and are no longer just to fulfill the needs of their owners, but have become identity cards for them and their regions. Among the most important of these industries, we have the leather industry, as the latter has been linked to the history of several Algerian regions through the ages, and the local population used leather to manufacture various clothes and equipment (Chelbi and Abdessamd, 2022). This industry has evolved to contribute to Algeria's economic income.

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The leather industry is a vital economic sector that plays an essential role in strengthening the Algerian national economy (Wulandari et al., 2024; Kumar, 1997; Gupta et al., 2019; Su et al., 2023; Pringle et al., 2016). The industry's history dates back centuries and has been associated with traditions and crafts that reflect local culture and heritage (Li et al., 2019). In recent years, the leather industry has witnessed significant technological and innovation developments, which have increased productivity and improved product quality. The leather industry in Algeria contributes in many ways to supporting the national economy. It provides job opportunities for many citizens (Kaba, 2022) in collecting raw leather and processing and manufacturing processes. It is also an essential source of income for many families, both in rural and urban areas. In addition, this industry contributes to the increase of Algerian exports by exporting semi-finished and manufactured leather products to world markets, thus strengthening the national balance of payments. The leather industry in Djelfa is one of the most prominent traditional sectors that reflect a rich history and cultural heritage.

The area features various leather products, such as traditional saddles, shoes, handbags, and trouser belts, which are masterpieces that highlight manual skills passed down through generations. These industries contribute to the local economy and add a vital tourist dimension, attracting visitors wishing to discover Algeria's authentic heritage. Tourists can enjoy a unique experience by learning about the stages of manufacturing these products and participating in exhibitions and craft markets, which enhances Djelfa's position as a distinguished cultural tourism destination (MTA, 2023).

From the above, we will focus in this study on two main dimensions (national and local) using and tracking the course of this sector by answering two fundamental questions: First: How effective is the performance of the leather and footwear sector in the Algerian economy for the period (1974-2021)? Second: What is the extent of the contribution of livestock to the development and prosperity of the leather industry in the province of Djelfa?

## MATERIALS AND METHODS

To reach reliable scientific results and to answer our problem, we used the experimental approach that relies on the case study, and the focus was on studying and analyzing the available data on the leather and footwear sector through the use of some descriptive statistical measures and quantitative methods, represented in the analysis of the essential components (P.C.A), the method of differentiation and the analysis of hierarchical factors. To ensure the efficiency and accuracy of our data analysis, we used a range of automated data processing software, including SPSS, Excel, and EViews. The variables of production and exploitation accounts depended on 19 sectors representing the Algerian economy between 1974 and 2021. Based on this, the values of eight variables were calculated for forty-eight years (Table 1).

Table 1. Evolution of total production and utilization in the leather and footwear sector in Algeria for the period 1794-2021 (In Millions Algerian dinar) (Source: retrospective of economic accounts from 1963 to 2021, ONS, Algiers, November 2023)

years	GGRP	GNIC	NGVA	GCFNA	GNI	GNTP	GNEC	GNSNE
1974	696.3	448.3	248.0	32.4	215.6	41.1	135.1	39.4
1975	727.3	458.0	269.3	33.4	235.9	39.4	142.3	54.2
1976	790.1	475.5	314.6	32.6	282.0	51.7	187.5	42.8
1977	834.0	477.4	356.6	33.6	323.0	80.6	193.2	49.2
1978	981.0	551.2	429.8	39.8	390.0	33.1	245.0	111.9
1979	989.3	557.5	431.8	30.1	401.7	49.5	249.0	103.2
1980	1232.8	629.6	603.2	54.1	549.1	70.6	382.8	95.7
1981	1337.0	684.7	652.3	51.2	601.1	74.9	398.1	128.1
1982	1530.4	780.7	749.7	56.6	693.1	81.7	465.5	145.9
1983	1702.4	944.6	757.8	46.3	711.5	89.5	469.4	152.6
1984	1922.3	1051.0	871.3	68.5	802.8	64.0	502.1	236.7
1985	2127.3	1151.9	975.4	80.7	894.7	158.6	560.5	175.6
1986	2285.2	1195.5	1089.7	80.6	1009.1	160.4	624.4	224.3
1987	2409.1	1298.5	1110.6	90.4	1020.2	146.7	630.4	243.1
1988	2524.8	1452.1	1072.7	120.0	952.7	331.0	631.5	-9.8
1989	3029.1	1715.2	1313.9	106.3	1207.6	131.6	781.3	294.7
1990	3992.8	2233.0	1759.8	120.8	1639.0	201.9	925.1	512.0
1991	4963.0	2974.9	1988.1	208.2	1780.0	215.5	985.8	578.7
1992	4981.5	3024.6	1956.9	215.6	1741.3	138.6	1223.1	379.6
1993	4971.1	2986.4	1984.7	408.5	1576.2	157.3	1250.6	168.3
1994	5975.8	3492.8	2483.0	400.9	2082.1	188.0	1548.3	345.8
1995	5675.7	3551.3	2124.4	462.1	1662.3	185.5	1608.8	-132.1
1996	5369.5	3304.8	2064.6	471.4	1593.3	197.0	1563.6	-167.3
1997	2510.5	1387.7	1122.9	68.7	1054.1	58.1	336.4	659.6
1998	6641.2	4065.8	2575.4	488.8	2086.6	178.9	1858.9	48.8
1999	5613.9	3432.0	2181.9	333.7	1848.2	147.3	1276.8	424.1
2000	6039.5	3640.2	2399.3	342.4	2056.9	154.6	1266.3	635.9
2001	5936.1	3662.8	2273.2	220.6	2052.6	180.9	1362.8	508.9
2002	6916.8	4313.9	2602.8	195.1	2407.6	185.1	1047.6	1175.0
2003	6555.8	4078.1	2477.7	191.9	2285.8	178.1	998.5	1109.2
2004	6950.6	4262.0	2688.6	203.7	2485.0	192.6	1092.9	1199.5
2005	6837.5	4116.6	2720.9	192.7	2528.2	184.6	1147.8	1195.9
2006	6327.0	3758.6	2568.4	181.4	2387.0	167.6	1044.4	1175.0

2007	5870.3	3484.9	2385.4	160.8	2224.5	148.3	903.9	1172.4
2008	6162.3	3635.3	2527.0	168.2	2358.8	144.3	967.3	1247.1
2009	6236.3	3686.9	2549.5	159.3	2390.1	149.0	958.1	1283.0
2010	5375.7	3724.7	2593.3	164.0	2429.3	155.0	984.0	1290.4
2011	6295.8	3692.2	2603.5	150.7	2452.8	150.8	1013.7	1288.2
2012	6466.7	3801.3	2665.4	158.1	2507.3	157.3	967.4	1382.6
2013	6432.9	3782.4	2650.5	156.4	2494.0	153.6	973.3	1367.1
2014	6779.4	3900.5	2879.0	220.9	2657.9	169.6	926.6	1561.9
2015	6659.8	3696.1	2963.6	241.3	2722.3	180.2	949.7	1592.5
2016	6665.0	3829.2	2835.8	215.6	2620.2	170.0	968.3	1481.9
2017	6654.9	3802.6	2852.3	205.1	2647.2	168.2	955.2	1523.7
2018	7184.7	4104.6	3080.1	249.5	2830.6	186.6	1038.7	1605.3
2019	7637.5	4353.9	3283.6	270.4	3013.2	199.4	1119.4	1694.3
2020	7273.7	4106.4	3167.3	210.3	2957.1	181.2	1008.8	1767.0
2021	8402.5	4712.3	3690.2	224.0	3466.2	207.0	1141.5	2117.6

Table 2. Statistical measures of study variables (Source: Authors, 2024)

N=48	Min	Max	Means	Standard deviation	CV %
<b>GNRP</b>	0.03	1.00	0.3114	0.29311	94.12
<b>GNIC</b>	0.05	1.78	0.4895	0.44761	91.44
<b>NGVA</b>	0.02	0.57	0.2099	0.20140	95.95
<b>GCNFA</b>	0.01	0.88	0.2113	0.20579	97.39
<b>GNI</b>	0.02	0.55	0.2108	0.20524	97.36
<b>GTNP</b>	0.01	0.90	0.2066	0.25624	124.02
<b>GNEC</b>	0.04	1.14	0.4456	0.36992	83.01
<b>GNSNE</b>	-0.01	0.30	0.0875	0.09305	106.34

Table 3. Correlation matrix (Source: Authors, 2024)

N = 48	GNRP	GNIC	NGVA	CFFS	GNI	GTNP	GNEC	GNSNE
GNRP	1	0.993	0.990	0.914	0.983	0.909	0.977	0.850
GNIC	0.993	1	0.968	0.937	0.956	0.901	0.965	0.813
NGVA	0.990	0.968	1	0.867	0.998	0.897	0.977	0.883
GCNFA	0.914	0.937	0.867	1	0.839	0.810	0.913	0.640
GNI	0.983	0.956	0.998	0.839	1	0.892	0.968	0.896
GTNP	0.909	0.901	0.897	0.810	0.892	1	0.856	0.652
GNEC	0.977	0.965	0.977	0.913	0.968	0.856	1	0.818
GNSNE	0.850	0.813	0.883	0.640	0.896	0.652	0.818	1

This will help us analyze the descriptive statistical values in Table 2 and the correlation coefficient values in Table 3. We relied on the accompanying graphs to develop the values of these variables. The National Bureau of Statistics data was relied upon as the official source for all Algerian data, and the proportions of the leather and footwear sector were calculated by calculating them from the total sectors of the Algerian economy. The work was done according to the steps as shown in the flowchart bellow (Figure 1). The leather industry in Algeria is one of the most vital contributors to the Algerian economy, especially as it is linked to sustainable rural development, whether raising livestock, revitalizing vast natural pastures, or growing fodder crops, due to its contribution to GDP, jobs, trade and preserving an ancient heritage for past and future generations. These customs and traditions of the leather industry continue, as their importance often exceeds the economic value, and they positively affect other sectors and contribute to the diversification of the country's economy.

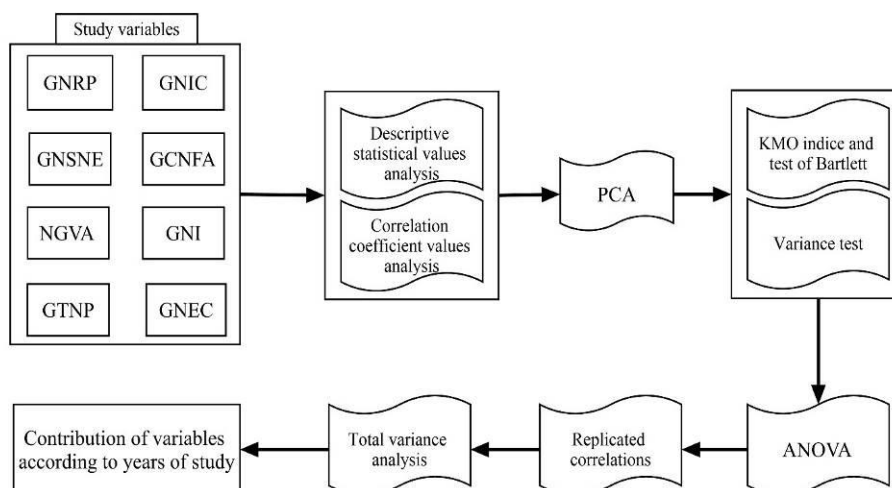


Figure 1. Flowchart showing analysis steps (Source: Authors, 2024)

In this context, we will address the contribution of the leather and footwear sector to the national economy through eight (8) variables shown in Table 4. We will also mention the total livestock of the province of Djelfa in Table 5.

Table 4. Study variables (Source: Authors, 2024)

GGRP	Gross National Raw Production
GNIC	Gross National Intermediate Consumption
NGVA	National Gross Value Added
GCNFA	National Gross Fixed Assets Depreciation
GNI	National Gross Domestic Income
GTNP	Gross national production-related taxes
GNEC	Gross national labor compensation
GNSNE	Gross national net exploitation surplus

Table 5. Total livestock of the province of Djelfa (Source: MARD + Regional Slaughterhouse of Hassi Bahbah Municipality, Djelfa province, 2021)

	Sheep	Cows	Goat	Camels	Red meat (quintals)	Leather production (quintals)
Djelfa State	3 353 800	22 100	378 200	774	477 670	91935

**The role of livestock in leather production in light of sustainable rural development in the province of Djelfa as a model**

The province of Djelfa, the first nationally in terms of livestock breeding and steppe natural pastures, occupies a strategic location between northern and southern Algeria, about 300 km from the capital Algiers. This makes it a basic transition zone that combines the characteristics of steppes and mountains. It relies heavily on pastoral and agricultural activity and is vital to the region's economy and the local community (Figure 2).

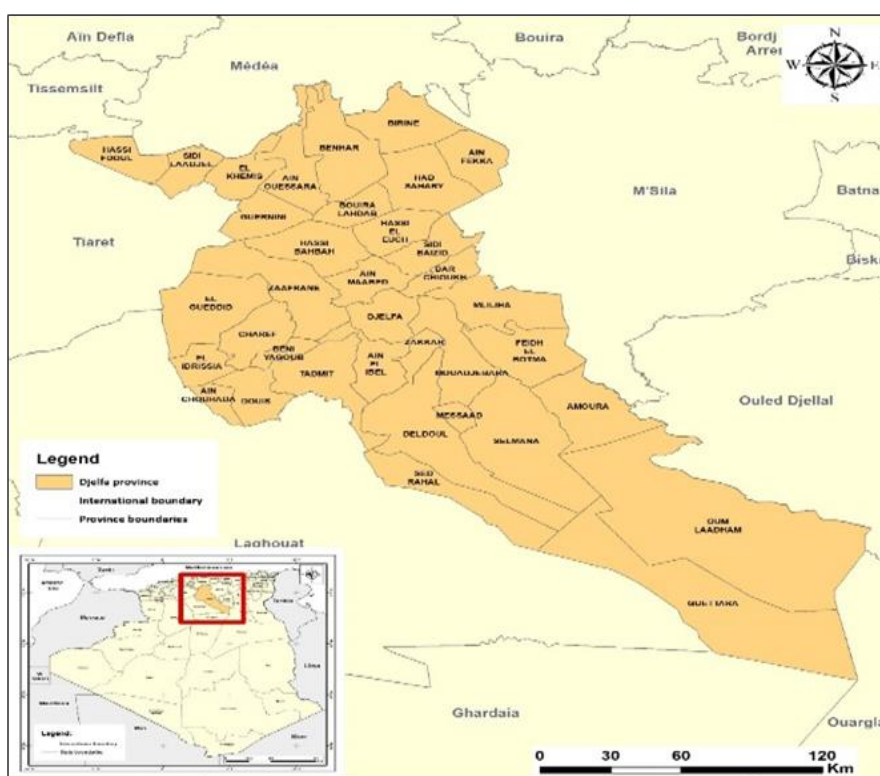


Figure 2. Administrative location of Djelfa province (Source: Authors, 2024)



Figure 3. Regional slaughterhouse of the municipality of Hassi Bahbah, Djelfa province a-d (Source: Authors, 2024)

In 2014 the province of Djelfa benefited from a regional slaughterhouse, and the regional slaughterhouse complex located in the municipality of Hassi Bahbah (50 km north of the municipality of Djelfa) is an important development gain that the sector relies on to provide red meat by ensuring productivity and controlling its market at the national level (Figure 3). This third compound of its kind at the national level effectively contributes to the revival of a new dynamism in the livestock market, as its capacity is estimated at the daily average slaughter of 2000 sheep and 80 head of cows (regional slaughterhouse of Hassi Bahbah, 2021), this project seeks to give a strong economic and social impetus in light of the

qualifications that the state abounds in various fields related to the agricultural sector, not to mention the creation of jobs and support for the national economy, to make the state a pole par excellence in this field. The Algerian government recognizes the importance of Djelfa as a significant livestock breeding area, and the state has launched several programs to improve rangeland management and protect it from degradation by strengthening infrastructure and implementing pasture rehabilitation projects (MARD, 2020), figures 4 and 5 show the area's dominant vegetation and livestock. It also provides financial support through soft loans and feed subsidies to encourage breeders to adopt sustainable practices. The government has launched projects to plant native plants and improve water management to enhance the regenerative capacity of rangelands. Workshops and awareness campaigns are organized for breeders to preserve natural rangelands and avoid overgrazing. (Rahouadja et al., 2024; Harkat et al., 2023; Yahia et al., 2020; Siad et al., 2022; Bencherif et al., 2021).



Figure 4. Vegetation cover of natural pastures (steppes) in the Djelfa province (a: *Artemisia herba-alba*, b: Natural grasslands in the steppe, c: *Stipa tenacissima*) (Source: Authors, 2024)



Figure 5. Herds of sheep and goats in the Djelfa province a-c (Source: Authors, 2023)



Figure 6. Horse saddles are traditionally made of leather, wood a-h (Source: Authors, 2024)

The Djelfa region is among the leading areas in the leather industries with various leather products, such as shoes, bags, belts, and horse saddles, and usually uses natural materials such as animal skin and is characterized by a manual manufacturing process that depends on the experience and craftsmanship of the manufacturer, and includes several stages of skin preparation, formation, coloring, drying, and finishing. It is characterized by using only natural materials, from animal leather to stitches and handmade tools. It depends on unique designs that reflect the culture and heritage features to which artisans specialized in this field belong. The preservation of the traditional leather industry is of great importance because this industry is part of the cultural and historical heritage of peoples, reflects the cultural identity of the communities that practice it, and contributes significantly to the development of the local economy and the provision of job opportunities for the local population. The quality of leather is divided according to its uses into:

**Light skins:** They are manufactured from the skins of sheep, goats, and young calves and are used in the industries of leather clothing, leather shoes, and leather goods for decoration.

**Heavy skins:** They are manufactured from large cows and are used in bags, saddles, and slippers. As for the statistics on craftsmen and workshops, we will show them in Table 6.

Table 6. Statistics on traditional workshops for leather industries in the province of Djelfa (Source: Authors, 2024)

	Number of workshops for the manufacture of traditional shoes, bags and other supplies	Number of workshops for the manufacture of horse saddles	Number of craftsmen
Djelfa province	310	62	865

Handicrafts and crafts are considered one of the components of national identity, and preserving them means preserving belonging, standing in the face of intellectual alienation and cultural invasion, educating young people with a sense of pride in their historical heritage, and linking the rope of communication between generations grandparents and children (Figures 6, 7 and 8). The diversity and richness of Algeria, with its different climates, topography, and even the origins of its peoples, made the nature of its people and their ways of living vary from one place to another. Crafts and traditional industries are the first and only means of expressing the culture and authenticity of society, as they are a source of livelihood for many members of society and express the various aspects of life through works of art such as drawings, shapes, and decorations that we draw and see in the products of traditional crafts and industries derived from the environment and its civilized and historical character. Djelfa is like other areas that abound in many crafts and industries that express their originality and culture, so it is often a source of livelihood for many people who still retain their characteristics, industrial methods, and artistic decorations today. This is evident through leather and even textile crafts and their distinction in forms and materials, industries that rely entirely on livestock and focus on producing consumer goods. It is widespread in most areas of the province of Djelfa.



Figure 7. The popular traditional shoe (al-Taabi) Memssaad district a-d (Source: Authors, 2024)



Figure 8. Traditional leather products, shoes, belts, bags etc. Djelfa province a-l (Source: Authors, 2024)

## RESULTS AND DISCUSSION

We statistically analyzed the contribution of the leather and footwear sector using the eight study variables below. These variables will be statistically analyzed according to the mechanisms mentioned above, and the relationship of these variables with each other will be studied.

### 1. Statistical analysis of the contribution of the leather and footwear sector:

#### 1.1. Contribution to the Gross National Raw Production (GNRP)

It is clear from the values of this variable that the contribution of this sector achieved at the national level during the study

period was limited between the lowest value (0.03%), recorded in (2019), and the highest value (1%), recorded in (1974), with an average of (0.311%), and a standard deviation of (0.293%). Hence, the amount of the average difference coefficient is (94.21%), which indicates the fluctuation of the values of this variable. The variable (GNRP) is strongly correlated with the following variables: the variable gross national intermediate consumption (GNIC) is correlated by (99.3%), the variable is gross national value added (NGVA) by (99.0%), the variable is gross national wage compensation (GNEC) by (97.7%), the variable is gross national domestic income (GNI) by (98.3%), the variable is gross taxes associated with national production (GTNP) by (90.9%), and the variable is gross national fixed asset depreciation (GCNFA), by (91.4%). The variable is the total net surplus of national exploitation (GNSNE), by (85%), and these correlations are all significant at a significant level (0.01).

### **1.2. Contribution to the Gross National Intermediate Consumption (GNIC)**

It is clear from the values of this variable that the contribution of this sector to the total intermediate consumption achieved at the national level during the study period was limited between the lowest value (0.048%), recorded in (2018), and the highest value (1.78%), recorded in (1974), with an average of (0.48%), with a standard deviation of (0.44%). Therefore, the amount of the coefficient of variation is (91.16%), which indicates the fluctuation of the values of this constantly decreasing variable. The variable (GNIC) is highly correlated with the following variables: the variable is gross national value added (NGVA) (96.8%), the variable is gross national wage compensation (GNEC) (96.5%), the variable is gross national income (GNI) (95.6%), the variable is gross national fixed asset depreciation (GCNFA) (93.7%), the variable is gross taxes associated with national production (GTNP) (90.1%), and the variable is gross net surplus exploitation (GNSNE), (81.3%), all of which are significant. At a significant level (0.01).

### **1.3. Contribution to the National Gross Value Added (NGVA)**

It is clear from the values of this variable that the contribution of this sector to the total crude production (NGVA), achieved at the national level during the study period, was limited between the lowest value (0.02%) recorded in (2018) and the highest value (0.57%) recorded in (1975), with an average of (0.209%), and a standard deviation of (0.201%), including that the magnitude of the coefficient of variation is (96.17%), which indicates the fluctuation of the values of this continuously decreasing variable. The variable (NGVA) is highly correlated with the following variables: the variable gross national income (GNI), (99.8%), the variable gross national wage compensation (GNEC), (97.7%), the variable total taxes associated with national production (GTNP), (89.7%), the variable gross net surplus of national exploitation (GNSNE), (88.3%), and the variable gross national fixed asset depreciation (GCNFA), (86.7%), and these correlations are all significant at a significant level (0.01).

### **1.4. Contribution to the National Gross Fixed Assets Depreciation (GCNFA)**

It is clear from the values of this variable that the contribution of this sector to the total fixed assets (GCNFA), achieved at the national level during the study period, was limited between the lowest value (0.01%), recorded in (2021), and the highest value (0.88%), recorded in (1974), with an average of (0.211%), and a standard deviation of (0.205%), hence the magnitude of the coefficient of variation is (97.15%), which indicates the fluctuation of the values of this variable with a decreasing trend. The variable (GCNFA) is highly correlated with the following variables: the variable gross compensation of national wage earners (GNEC) (91.3%), the variable total taxes associated with national production (GTNP) (81%), the variable gross national income (GNI), (83.9%), and the variable total net surplus of national exploitation (GNSNE), (64%), all of which are significant at a significant level (0.01).

### **1.5. Contribution to the National Gross Domestic Income (GNI)**

The values of this variable show that the contribution of this sector to the National Gross Income (GNI), achieved at the national level during the study period, was limited between the lowest value (0.02%), recorded in (2018) and the highest value (0.55%), recorded in (1975), with an average of (0.210%), and a standard deviation of (0.205%), hence the magnitude of the coefficient of variation is (97.16%), which indicates the fluctuation of the values of this variable with a decreasing trend. The variable (GNI) is significantly related to the following variables: the variable gross compensation of national employees (GNEC) (96.8%), the variable total net surplus of national exploitation (GNSNE) (89.6%), and the variable total taxes associated with national production (GTNP) (89.2%). These correlations are all significant at a significant level (0.01).

### **1.6. Contribution to the Gross national production-related taxes (GTNP)**

The values of this variable show that the contribution of this sector to the total production-related taxes (GTNP), achieved at the national level during the study period, was limited between the lowest value (0.01%), recorded in (2013) and the highest value (0.90%), recorded in (1977), with an average of (0.206%), and a standard deviation of (0.256%), and therefore the magnitude of the coefficient of variation is (121.90%), which indicates the fluctuation of the values of this variable with a trend. Decreasing despite some outliers. The GTNP variable is correlated with the remaining two variables differently: with the variable is the total compensation of national employees (GNEC) (85.6%), and the variable is the total net surplus of national exploitation (GNSNE) (65.2%), all of which are significant at a significant level (0.01).

### **1.7. Contribution to the Gross national labor compensation (GNEC)**

It is clear from the values of this variable that the contribution of this sector to the total compensation of national employees (GNEC), achieved at the national level during the study period, was limited between the lowest value (0.04%), recorded in (2020), and the highest value (1.14%), recorded in (1974), with an average of (0.445%), and a standard

deviation of (0.369%), and therefore the magnitude of the coefficient of variation is (82.92%), which indicates homogeneity in the values of this variable with a trend. Reducing. The GNEC variable is significantly correlated with the GNSNE variable (81.8%), which is significant at a significant level (0.01).

**1.8. Contribution to the Gross national net exploitation surplus (GNSNE)**

It is clear from the values of this variable that the contribution of this sector to the total net surplus of national exploitation (GNSNE), achieved at the national level during the study period, was limited between the lowest value (-0.01%), recorded in (1996), and the highest value (0.30%), recorded in (1978), with an average of (0.875%), and a standard deviation of (0.930%), and therefore the magnitude of the coefficient of variation is (106.28%), This indicates a very violent fluctuation in the values of these variables compared to others, with their trend decreasing .The curves shown in Figure 9 illustrate this.

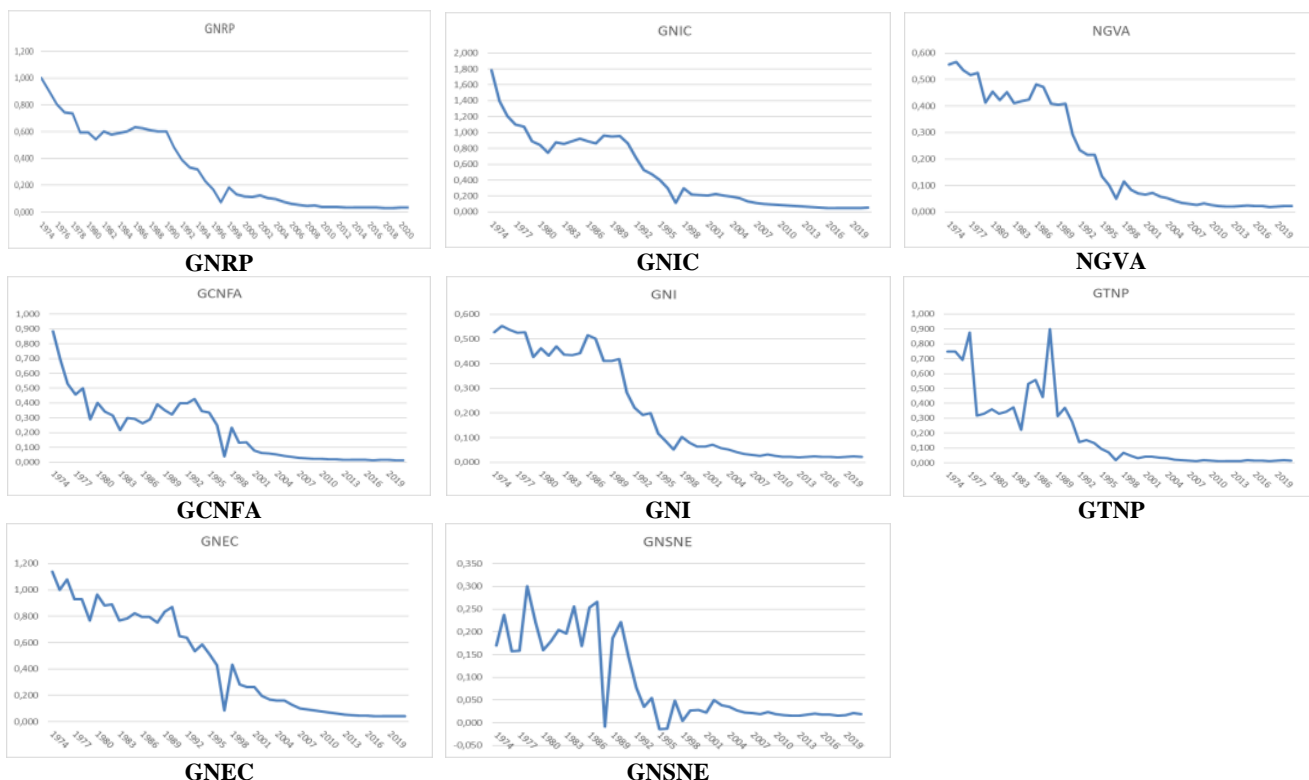


Figure 9. Evolution of the contribution of the leather and footwear sector of the leather and footwear sector in different variables (Source: Authors, 2024)

**2. Testing the verification of factor analysis hypotheses into basic components**

This method has a set of hypotheses. The factor analysis of essential components depends on the matrix of correlations between the study variables shown in Table (3), which prepares for calculating the common variances and eigenvalues and the correlation of the variables with the factors explaining the phenomenon under study and analysis.

A. The first hypothesis of (P.C.A) that the absolute value of the determinant of the correlation coefficients matrix is different from zero, is fulfilled in Table (7), where: (Determining = 2.495E-014), which indicates the validity of the data and results of the analysis.

B. The second hypothesis is fulfilled in Tables (7), (8), and (9), ( $KMO = 0.789 > 0.5$ ), which indicates the adequacy of the sample under study, and the result of the Bartlett test is significant, )  $Sig. = 0.000 < \alpha = 0.05$  (

Moreover, this is an indication that the correlation matrix is different from the unity matrix, meaning that there are common variations between the study variables that constitute the set of hidden factors, which is what we seek to reveal (Arsham et al., 2011; Tobias, et al., 1969). The Kaiser-Meyer-Olkin (KMO) and Bartlett's tests are statistical measures used to assess the suitability of data for factor analysis.

Table 7. Indices KMO and test de Bartlett; Determinant = 2.495E-014 (Source: Authors, 2024)

Precision measurement of Kaiser-Meyer-Olkin sampling.		0.789
Bartlett sphericity test	Chi-square approximated	1362.496
	ddl	28
	Signification de Bartlett	0.000

Table 8. Homogeneity of variance test (Source: Authors, 2024)

Variable			
Levene Statistics	df1	df2	Signification
31.696	7	376	0.000



Table 9. ANOVA (Source: Authors, 2024)

		Sum. Squares	df	Average squares	F	Mr.
Inter-group	Combined	6.174	7	0.882	11.335	0.0000
	Linear Term	0.923	1	0.923	11.859	0.0010
	Deviation	5.251	6	0.875	11.248	0.0000
Intra-group		29.256	376	0.078		
Total		35.430	383			

C. The third hypothesis in Table (9), the adequacy of the sample for each of the variables of the study, is fulfilled if we follow the numbers marked with the letter (a) in the main diagonal of the matrix of visual coefficients, we find that the variables have a visual correlation coefficient of not less than (0.70), that is (100%), which indicates that this percentage of variables meets the hypothesis of the adequacy of the sample for each variable (Judd et al., 2017).

Extraction Method: Principal Component Analysis has. Reproduction quality

Table 10. Replicated correlations (a) Reproduction quality (Source: Authors, 2024)

	GNRP	GNIC	NGVA	GCNFA	GNI	GTNP	GNEC	GNSNE
GNRP	<b>0.998<sup>a</sup></b>	0.987	0.993	0.908	0.987	0.907	0.98	0.857
GNIC	0.987	<b>0.976<sup>a</sup></b>	0.982	0.898	0.976	0.897	0.969	0.848
NGVA	0.993	0.982	<b>0.989<sup>a</sup></b>	0.903	0.982	0.903	0.975	0.853
GCNFA	0.908	0.898	0.903	<b>0.825<sup>a</sup></b>	0.897	0.825	0.891	0.779
GNI	0.987	0.976	0.982	0.897	<b>0.976<sup>a</sup></b>	0.897	0.969	0.847
GTNP	0.907	0.897	0.903	0.825	0.897	<b>0.824<sup>a</sup></b>	0.89	0.779
GNEC	0.98	0.969	0.975	0.891	0.969	0.89	<b>0.962<sup>a</sup></b>	0.841
GNSNE	0.857	0.848	0.853	0.779	0.847	0.779	0.841	<b>0.736<sup>a</sup></b>

**2.1 Quality of representation of variables**

The goal of using (P.C.A) is to find a minimum number of variables representing all the proposed primary variables, and the question arises: How well is the representation of these variables? Table (10) shows the quality of the representation of variables based on multiple correlation coefficients and the number of common variations between variables. The study variables are of high-quality representation through the second column (Extraction).

Table 11. Total variance explained (Source: Authors, 2024)

Component	Initial eigenvalues	Extraction Sums of squares of selected factors				
	Total	% Variance	Cumulative %	Total	% Variance	Cumulative %
GNRP	7.286	91.074	91.074	<b>7.286</b>	91.074	91.074
GNIC	0.431	5.390	96.464			
NGVA	0.210	2.623	99.087			
GCNFA	0.055	0.690	99.777			
GNI	0.014	0.172	99.949			
GTNP	0.004	0.047	99.996			
GNEC	0.000	0.004	99.999			
GNSNE	4.231E-005	0.001	100.000			

Extraction method: Principal component analysis. In Table (11), we focus on the column resulting from the use of the factor analysis method of essential components, which refers to the eigenvalues after rotating the axes. The latter aims to convert the primary correlation matrix into a parabolic correlation matrix characterized by a great deal of clarity by maximizing significant correlations and scaling minor correlations

- The factor axis (91.074%) is interpreted as a total dispersion corresponding to the highest eigenvalue of  $\lambda=7.286$ .

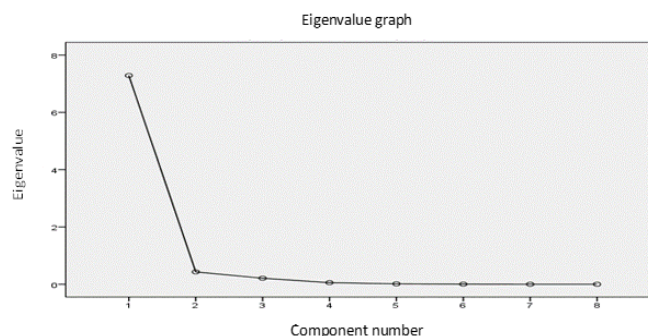


Figure 10. Eigenvalues (Source: Authors, 2024)

Figure 10 shows the eigenvalues that can be taken and those that can be excluded according to the (Cattell, R. B. 1966) method, where the figure shows the eigenvalue with a steep slope, we find that there is an eigenvalue corresponding to the

extracted factor, after which the rest of the values tend to regression horizontally, and are thus excluded from the model. Thanks to the rotation process of the primary axes, as well as the trend adopted in assigning the lowest acceptable value of correlation (in this study, it was set at 0.50), we obtained the matrix of factors after rotation shown in Table (10), the matrix of this Table is evident in the possibility of observing the variables associated with each of the extracted factors, which facilitates the process of interpreting them and revealing the meanings they contain. We have relied on naming the extracted factors on the methods of description and causality, as the variables of the study are economic indicators (production and exploitation accounts) that allow description and also allows determining the cause based on their economic explanations; the interpretation depends on:

- the nature of the variables that were associated with the factor.
- Familiarity with the conditions relevant to the phenomenon under study.
- Relying on the prevailing theories and trends in the field to which the phenomenon belongs.

**2.1 Naming of extracted factors**

Based on the matrix of factors after rotating axes, Table 11 can be included to provide a preliminary description of the factors explaining the importance and weight of the leather and footwear sector in the Algerian economy.

**2.2 Description of the pivotal factor**

It includes all the variables of the study, which can be described as elements of the production chain. It is considered the expense of the production process's inputs and outputs. Therefore, the leather and footwear sector's importance in the Algerian economy is shown through its contribution to production processes. The graph above reflects the high quality of representation, as the points of variables move away from the center of the circle drawn inside the square and close to their surroundings.

**2.3 Classification of years of study**

Here, we try to determine the group of similar years by looking at the variables of the study; for this purpose and based on the results obtained in the previous paragraph, we examine the shape of the trend of distribution of the years of study in Figure 11, and this is by resorting to the method of hierarchical cluster analysis, we conclude from the shape of the tree drawing that the years of study can be divided into two groups.

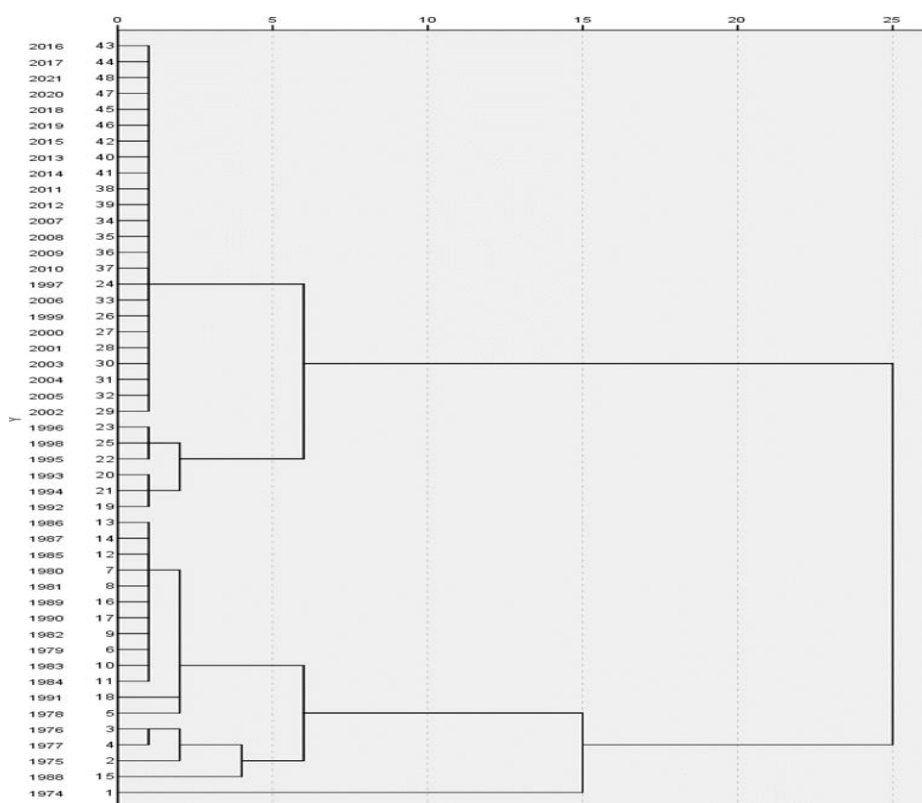


Figure 11. Tree of structures using interne classes Distance of combining intermediate degrees (Source: Authors, 2024)

The first group includes the annual period (1974 to 1998), i.e. (25), a year representing (52.1%), of the years of study; this behavior reflects the circumstances of a stage that the Algerian economy went through, which was characterized by the adoption of a socialist management policy, so this had an impact on the activity of the leather and footwear sector, so we find the behavior of this group differs from the behavior of the second group (1999 to 2021), which includes the rest of the years, represented in (23), years (57.9%), this behavior reflects the circumstances that had an impact on the activity of the leather and footwear sector, in addition to other sectors interacting with it. Such a result for the leather and footwear sector must be explained in collaboration with the rest of the economic sectors and the

nature of the different policies adopted by the state during the study period, in addition to the political, economic, and other conditions. The statistical analysis of the study variables shows the following: The coefficients of variation showed the heterogeneity of the values of all variables, and the values of the correlation coefficients were strong between the study variables and statistically significant at a significant level (0.01), by tracking the contribution of each variable, we noticed a continuous increase during the study period, through the results of the factor analysis, we concluded that there is a single pivotal factor represented in the inputs and outputs of the production process, we found in the classification of study years that they can be arranged in two groups, the first (25), the second (23) years. This classification reflects the management policy of the sector at every stage.

## CONCLUSION AND RECOMMENDATIONS

The leather industry plays a vital role in the Algerian national economy, contributing to the country's GDP and providing employment opportunities for many people, especially in agriculture, livestock, and manufacturing. The leather industry also supports other related industries, such as fashion, footwear, and luxury goods, promoting economic growth and diversification. Moreover, it boosts export activities, contributing to the country's foreign exchange earnings. Leather products in Algeria are highly valued in international markets and have the potential to strengthen the country's trade balance. It also plays a crucial role in preserving the national cultural and tourist heritage, as many traditional crafts and techniques are used to produce leather goods. This adds value to national identity and promotes tourism and cultural exchange, benefiting the economy. From the above, we came up with these recommendations:

Algeria's leather sector's current state is different from its enormous potential in terms of livestock and natural pastures. This sector can be much better with a little effort and wise management.

The renewed efforts of the Ministry of Agriculture and Rural Development, through the programs of the new sustainable rural development strategy based on supporting farmers, loyalists, and breeders, which urge respect for the specificity of the regions, are a clear indicator for the development of this sector and moving it forward by reviving natural pastures with plans to eliminate desertification of all kinds, encouraging and supporting the local population to develop and diversify their agriculture, and urging them to grow fodder crops to develop their livestock and invest in them in modern and scientific ways. This is in line with increasing their profitability and thus developing all the products related to their agricultural activity, including the leather sector subject of our study.

On the tourism side, from the perspective of leather handicrafts, we notice the decline of workshops and artisans at the national level due to their lack of financial feasibility for their craft. On the other hand, its effectiveness in domestic and foreign tourism has a strategic tourism dimension for the Algerian economy and, therefore, must be financially supported, morally encouraged, and educational workshops organized and held. There must also be clear policies to support local artisans and motivate young people to engage in industry by providing financial incentives and concessional loan facilities. This would preserve Algeria's rich cultural heritage and strengthen its national identity through the revival and development of traditional crafts, ultimately leading to this vital sector's sustainable and inclusive development. The increasing demand for processed and semi-finished leather and the opening of global and local markets is an excellent opportunity to encourage investors and motivate them to enter the leather and footwear sector by providing technical support and administrative facilities, which enhances investor confidence and attracts them to it. Benefiting from this sector and providing an appropriate regulatory environment, tax incentives, and short- and long-term loans can contribute significantly to stimulating investments and developing local industries to create new jobs and strengthen the Algerian economy.

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## REFERENCES

- Ait-Yahia Ghidouche, K., Nechoud, L., & Ghidouche, F. (2021). Achieving sustainable development goals through agritourism in Algeria. *Worldwide Hospitality and Tourism Themes*, 13(1), 63-80. <https://doi.org/10.1108/whatt-08-2020-0092>
- Arsham, H., & Lovric, M. (2011). Bartlett's Test. *International encyclopedia of statistical science*, 2, 20-23. [https://doi.org/10.1007/978-3-642-04898-2\\_132](https://doi.org/10.1007/978-3-642-04898-2_132)
- Belarbi, D., & Boudier, A. (2023). Industrial Investing as An Instrument of Sustainable Development in Algeria (Case in Bouira Province-Eastern Algeria). *GeoJournal of Tourism and Geosites*, 47(2), 459-467. <https://doi.org/10.30892/gtg.47212-1044>
- Bencherif, S., Dahmani, M. B., Burgas, D., & Manzano, P. (2021). Current social and rangeland access trends among pastoralists in the Western Algerian steppe. *Land*, 10(7), 674. <https://doi.org/10.3390/land10070674>

- Bousbia, A., Gueroui, Y., Aouadi, A., Teweldebirhan, M. D., Bessa, R. J. B., Symeon, G., & Boudalia, S. (2024). Typology analysis of cattle farms in Northeast Algeria: Potential for sustainable development. *Agricultural Systems*, 218, 103995. <https://doi.org/10.1016/j.agry.2024.103995>
- Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate behavioral research*, 1(2), 245-276. [https://doi.org/10.1207/s15327906mbr0102\\_10](https://doi.org/10.1207/s15327906mbr0102_10)
- Chelbi, Z., & Abdessamad, R. (2022). Traditional leather industries and their role in the development of tourism, 7(36), 283-305. <https://doi.org/10.21608/mjaf.2021.56857.2159>
- Directorate of Tourism and Traditional Industry Djelfa. <https://djelfa.mta.gov.dz/>
- Ghediri, D., Boussalem, A., & Serdouk, F. (2022). The role of traditional industries and handicrafts as an inherited cultural heritage in promoting and developing desert tourism in the southern regions of Algeria.
- Gupta, S. K., Gupta, S., & Dharnija, P. (2019). An empirical study on productivity analysis of Indian leather industry. *Benchmarking: An International Journal*, 26(3), 815-835. <https://doi.org/10.1108/BIJ-06-2018-0156>
- Hammouda, R. F., Huguenin, J., Bouchareb, B., & Nedjraoui, D. (2014). Rangeland degradation and adaptation of livestock farming in the Algerian steppe: the case of Hadj Mechri (Wilaya of Laghouat). *Forage resources and ecosystem services provided by Mountain and Mediterranean grasslands and rangelands*. R. Baumont et al, 665-669.
- HARKAT, S., LAOUN, A., BELABDI, I., YABRIR, B., & LAFRI, M. (2023). Economic and ecological constraints on sheep management in the Algerian steppe. <https://doi.org/10.21203/rs.3.rs-2501846/v1>
- Judd, C. M., McClelland, G. H., & Ryan, C. S. (2017). *Data analysis: A model comparison approach to regression, ANOVA, and beyond*. Routledge. <https://doi.org/10.4324/9781315744131>
- Kaba, T. (2022). Geographical distribution of ixodid ticks and tick-borne pathogens of domestic animals in Ethiopia: a systematic review. *Parasites & Vectors*, 15(1), 108. <https://doi.org/10.1186/s13071-022-05221-x>
- Kumar, S. C. (1997). *Indian leather industry: Growth, productivity, and export performance*. APH Publishing.
- Laoubi, K., & Yamao, M. (2012). The challenge of agriculture in Algeria: are policies effective. *Bulletin of Agricultural and Fisheries Economics*, 12(1), 65-73. <https://doi.org/10.1504/IJPTI.2020.10032958>
- Le, V. T. P., Van Tuan, P., & Hai, N. C. (2024). Factors Affecting Sustainable Poverty Reduction Livelihoods in Rural Areas in the Mekong Delta, Vietnam. *GeoJournal of Tourism & Geosites*, 52(1). <https://doi.org/10.30892/gtg.52117-1194>
- Li, X., Xu, F., Xiang, N., Wang, Y., & Zhang, Y. (2019). Dynamic optimized cleaner production strategies to improve water environment and economic development in leather industrial parks: a case study in Xinji, China. *Sustainability*, 11(23), 6828. <https://doi.org/10.3390/su11236828>
- MARD Ministry Of Agriculture And Rural Development (2020). <https://madr.gov.dz/>
- Martínez-Valderrama, J., Ibáñez, J., Del Barrio, G., Alcalá, F. J., Sanjuán, M. E., Ruiz, A., & Puigdefábregas, J. (2018). Doomed to collapse: Why Algerian steppe rangelands are overgrazed and some lessons to help land-use transitions. *Science of the Total Environment*, 613, 1489-1497. <https://doi.org/10.1016/j.scitotenv.2017.07.058>
- MTA. Ministry of Tourism and Handicrafts (2023). <https://www.mta.gov.dz/>
- Mwinyihija, M. P. (2015). Africa's Renaissance and Potential in the Leather Sector with Reflection to the Global Performance. *Journal of African Leather and Leather Products Advances*, 2(1), 1-17. <https://doi.org/10.15677/jallpa.2015.v2i1.11>
- Mwinyihija, M., & Quiesenberry, W. (2013). Review of the challenges towards value addition of the leather sector in Africa. *Global Advanced Research Journal of Management and Business*, 2(11), 518-528.
- Nedjraoui, D. (2001). Country pasture/forage resource profiles. Algeria. Food and Agriculture Organization of the United Nations.
- ONS. Office for National Statistics. <https://www.ons.gov.uk/spip.php?rubrique4>
- Pham, P. A., Nguyen, H. H., & Luong, V. D. (2022). Some international experiences in upgrading leather industry in global value chains and recommendations for Vietnam. *Journal of Economic and Banking Studies*, 3, 36-47. [https://doi.org/10.1007/978-3-030-49974-7\\_4](https://doi.org/10.1007/978-3-030-49974-7_4)
- Pringle, T., Barwood, M., & Rahimifard, S. (2016). The challenges in achieving a circular economy within leather recycling. *Procedia CIRP*, 48, 544-549. <https://doi.org/10.1016/j.procir.2016.04.112>
- Rabhi, S. A., Rezzaf, M. A., Kherrou, L., & Souihel, K. (2023). Towards the Development of Ecotourism in the Ouled-Nail Mountains: A Case Study of the Djelfa Municipality in Algeria. *GeoJournal of Tourism and Geosites*, 50(4), 1411-1429. <https://doi.org/10.30892/gtg.50422-1140>
- Rafiuddin, M., & Satyanarayana, G. (2014). Challenges in exports: A study of India's leather industry. In *2014 International Conference on Science Engineering and Management Research (ICSEMR)* (pp. 1-7). IEEE. <https://doi.org/10.1109/ICSEMR.2014.7043640>
- Rahouadjia, F., Atchemdi, K. A., & Houari, A. (2024). Technical-economic impact of risk management on the semi-transhumant livestock system, case of ain el bell region in algeria. *International Journal of Professional Business Review: Int. J. Prof. Bus. Rev.*, 9(7), 21. <https://doi.org/10.26668/businessreview/2024.v9i7.4841>
- Regional Slaughterhouse of the Municipality of Hassi Bahbah 2021, Province of Djelfa, Algeria.
- Sahli, Z. (2010). Agriculture and Rural Development in Algeria. Status, Risks and Challenges. *Bulletin UASVM Horticulture*, 67(2) <https://doi.org/b35ad7e546282b832aee87f4cde83fb443ec4604>
- Siad, O., Deghnouche, K., Andrighetto, I., Contiero, B., Marchesini, G., Bedjaoui, H., & Cortese, M. (2022). Traits of intensive livestock systems in Algerian steppe territories. *Italian Journal of Animal Science*, 21(1), 41-50. <https://doi.org/10.1080/1828051X.2021.2014994>
- SPSS, M. O. D. (2015). SPSS (Statistical Package for the Social Sciens). <https://doi.org/10.51709/19951272/Winter-2021>
- Su, F., Song, N., Shang, H., & Fahad, S. (2023). Industrial agglomeration, spatial-temporal evolution and its driving factors: spatial interaction in Chinese leather industry. *Economic research-Ekonomska istraživanja*, 36(1). <https://doi.org/10.1080/1331677X.2023.2179504>
- Sutrisno, A. D., Lee, C. H., Suhardono, S., & Suryawan, I. W. K. (2024). Empowering communities for sustainable transition: integrating tourism with economic and sociodemographic dynamics in post-mining strategies. *GeoJournal of Tourism and Geosites*, 55(3), 1112-1123. <https://doi.org/10.30892/gtg.55312-1284>
- Tobias, S., & Carlson, J. E. (1969). Brief report: Bartlett's test of sphericity and chance findings in factor analysis. *Multivariate behavioral research*, 4(3), 375-377. [https://doi.org/10.1207/s15327906mbr0403\\_8](https://doi.org/10.1207/s15327906mbr0403_8)
- Wijijayanti, T., Salleh, N. H. M., Hashim, N. A., Mohd Saukani, M. N., & Abu Bakar, N. (2023). The feasibility of rural tourism in fostering real sustainable development in host communities. *GeoJournal of Tourism and Geosites*, 46(1), 336-345. <https://doi.org/10.30892/gtg.46137-1031>
- Wulandari, P. K., Baiquni, M., & Zubaidi, A. (2024). Preserving and Managing Chinese Settlement Heritage Tourism in Lasem, Indonesia. *GeoJournal of Tourism and Geosites*, 55(3), 1055-1065. <https://doi.org/10.30892/gtg.55307-1279>
- Yahia, A., Hamrat, K., Saidani, K., & Kaidi, R. (2020). Seroprevalence and risk factors of bovine brucellosis in the province of Djelfa (Algeria). *Indian Journal of Animal Research*, 54(11), 1433-1437. <https://doi.org/10.18805/ijar. B-893>