



# ÉTUDE DE MARCHÉ

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# sommaire

- MISE EN CONTEXTE
- PRÉPARATION DES DONNÉES
- ACP & CLASSIFICATION  
HIÉRARCHIQUE
- TEST STATISTIQUE & ANALYSE DES  
CLUSTERS
- CONCLUSION ET RECOMMANDATION



# Mise en contexte



Nous avons été engagé pour réaliser une étude de marché afin de recommander quelle sont les meilleurs pays pour une future implantation



# Notre objectif



Recommander une liste de 5 à 10 pays pour une future implantation



# PRÉPARATION DES DONNÉES



# 4 dataset :

Domain	Area Code	Area	Element	Item	Year	Unit	Value	
0	New Food Balances	2	Afghanistan	Food supply (kcal/capita/day)	Grand Total	2018	kcal/capita/day	2,040.00
1	New Food Balances	2	Afghanistan	Protein supply quantity (g/capita/day)	Grand Total	2018	g/capita/day	55.52
2	New Food Balances	2	Afghanistan	Food supply (kcal/capita/day)	Animal Products	2018	kcal/capita/day	191.00
3	New Food Balances	2	Afghanistan	Protein supply quantity (g/capita/day)	Animal Products	2018	g/capita/day	10.79
4	New Food Balances	3	Albania	Food supply (kcal/capita/day)	Grand Total	2018	kcal/capita/day	3,360.00

1

Bilans alimentaire : disponibilité en calorie et protéines des produit animalier plus particulièrement du poulet

Domain	Area Code	Area	Element	Item	Year	Unit	Value	
0	Livestock Primary	2	Afghanistan	Production	Meat, chicken	2018	tonnes	28850
1	Livestock Primary	2	Afghanistan	Import Quantity	Meat, chicken	2018	tonnes	23913
2	Livestock Primary	2	Afghanistan	Export Quantity	Meat, chicken	2018	tonnes	154
3	Livestock Primary	3	Albania	Production	Meat, chicken	2018	tonnes	15587
4	Livestock Primary	3	Albania	Import Quantity	Meat, chicken	2018	tonnes	11588

2

Le Poulet : Production, importation et exportation

Domain	Area Code	Area	Element	Item	Year	Unit	Value	
0	Annual population	2	Afghanistan	Total Population - Both sexes	Population - Est. & Proj.	2008	1000 persons	27,722.28
1	Annual population	2	Afghanistan	Total Population - Both sexes	Population - Est. & Proj.	2018	1000 persons	37,171.92
2	Annual population	3	Albania	Total Population - Both sexes	Population - Est. & Proj.	2008	1000 persons	3,002.68
3	Annual population	3	Albania	Total Population - Both sexes	Population - Est. & Proj.	2018	1000 persons	2,882.74
4	Annual population	4	Algeria	Total Population - Both sexes	Population - Est. & Proj.	2008	1000 persons	34,730.61

3

La population pour l'année 2008, 2018

Domain	Area Code	Area	Element	Item	Year	Unit	Value	
0	Suite of Food Security Indicators	2	Afghanistan	Value	Gross domestic product per capita, PPP, dissem...	2008	I\$	1,587.80
1	Suite of Food Security Indicators	2	Afghanistan	Value	Gross domestic product per capita, PPP, dissem...	2018	I\$	2,190.20
2	Suite of Food Security Indicators	2	Afghanistan	Value	Political stability and absence of violence/te...	2008	index	-2.69
3	Suite of Food Security Indicators	2	Afghanistan	Value	Political stability and absence of violence/te...	2018	index	-2.75
4	Suite of Food Security Indicators	3	Albania	Value	Gross domestic product per capita, PPP, dissem...	2008	I\$	10,119.10

4

PIB : indicateur PIB/ PIB par habitant

Aucune valeur manquante

Aucun doublon

```
[1]: data = pd.concat(dfs) # Concaténation
data
```

	Domain	Area Code	Area	Element	Item	Year	Unit	Value
0	New Food Balances	2	Afghanistan	Food supply (kcal/capita/day)		Grand Total	2018	kcal/capita/day 2,040.00
1	New Food Balances	2	Afghanistan	Protein supply quantity (g/capita/day)		Grand Total	2018	g/capita/day 55.52
2	New Food Balances	2	Afghanistan	Food supply (kcal/capita/day)		Animal Products	2018	kcal/capita/day 191.00
3	New Food Balances	2	Afghanistan	Protein supply quantity (g/capita/day)		Animal Products	2018	g/capita/day 10.79
4	New Food Balances	3	Albania	Food supply (kcal/capita/day)		Grand Total	2018	kcal/capita/day 3,360.00
...	...	...	...	...	...	...	...	...
759	Suite of Food Security Indicators	251	Zambia	Value	Political stability and absence of violence/te...	2018	index	0.14
760	Suite of Food Security Indicators	181	Zimbabwe	Value	Gross domestic product per capita, PPP, disse...	2008	IS	1,739.20
761	Suite of Food Security Indicators	181	Zimbabwe	Value	Gross domestic product per capita, PPP, disse...	2018	IS	3,130.00
762	Suite of Food Security Indicators	181	Zimbabwe	Value	Political stability and absence of violence/te...	2008	index	-1.21
763	Suite of Food Security Indicators	181	Zimbabwe	Value	Political stability and absence of violence/te...	2018	index	-0.71

2473 rows × 8 columns

```
[2]: data = data.pivot_table(index='Area', values='Value', columns=['Element', 'Item', 'Year']).reset_index()
data
```

Element	Area	Export	Food supply		Import	Production	Protein supply quantity		Total Population - Both sexes		Value		Gross domestic product per capita, PPP, dissemination (constant 2011 international \$)	Political stability and absence of violence/terrorism (index)	
		Quantity	(kcal/capita/day)	Quantity	(g/capita/day)		Grand Total	Meat, chicken	Animal Products	Grand Total	Meat, chicken	Population - Est. & Proj.			
		Item	Meat, chicken	Animal Products	Grand Total		Meat, chicken	Animal Products	Grand Total	Meat, chicken	Population - Est. & Proj.				
Year		2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	
0	Afghanistan	154.00	191.00	2,040.00	23,913.00	28,850.00	10.79	55.52	NaN	27,722.28	37,171.92	1,587.80	2,190.20	-2.69	-2.7
1	Albania	NaN	1,003.00	3,360.00	11,588.00	15,587.00	61.75	115.74	3.00	3,002.68	2,882.74	10,119.10	13,601.30	-0.03	0.3
2	Algeria	NaN	390.00	3,322.00	27.00	278,279.00	24.73	91.83	2.00	34,730.61	42,228.41	10,625.00	11,479.50	-1.09	-0.7
3	American Samoa	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	57.49	55.47	NaN	NaN	0.98	1.2
4	Andorra	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	83.86	77.01	NaN	NaN	1.34	1.4
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
233	Wallis and Futuna Islands	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	13.58	11.66	NaN	NaN	NaN	NaN
234	Western Sahara	NaN	NaN	NaN	NaN	NaN	NaN	NaN	NaN	468.63	567.40	NaN	NaN	NaN	NaN
235	Yemen	NaN	142.00	2,154.00	95,992.00	179,768.00	10.38	54.52	NaN	21,892.15	28,498.68	NaN	NaN	-2.01	-3.0
236	Zambia	1,387.00	159.00	2,002.00	10,540.00	49,487.00	13.70	60.53	NaN	12,848.53	17,351.71	2,747.40	3,521.50	0.47	0.1
237	Zimbabwe	NaN	159.00	1,908.00	3,758.00	65,837.00	11.59	44.15	2.00	12,379.55	14,438.80	1,739.20	3,130.00	-1.21	-0.7

238 rows × 15 columns

• DF FINAL

	pays	dispo_calories	dispo_proteines	ratio_proteines_animes	population	population_croissance	pib	ppa	pib_croissance	poulet_import-export
0	Afghanistan	2,040.00	55.52	0.19	37.17	1.34	2,190.20	0.00	1.38	155.28
1	Albania	3,360.00	115.74	0.53	2.88	0.96	13,601.30	0.00	1.34	NaN
2	Algeria	3,322.00	91.83	0.27	42.23	1.22	11,479.50	0.00	1.08	NaN
3	American Samoa	NaN	NaN	NaN	0.06	0.96	NaN	NaN	NaN	NaN
4	Andorra	NaN	NaN	NaN	0.08	0.92	NaN	NaN	NaN	NaN
...	...	...	...	...	...	...	...	...	...	...
233	Wallis and Futuna Islands	NaN	NaN	NaN	0.01	0.86	NaN	NaN	NaN	NaN
234	Western Sahara	NaN	NaN	NaN	0.57	1.21	NaN	NaN	NaN	NaN
235	Yemen	2,154.00	54.52	0.19	28.50	1.30	NaN	NaN	NaN	NaN
236	Zambia	2,002.00	60.53	0.23	17.35	1.35	3,521.50	0.00	1.28	7.60
237	Zimbabwe	1,908.00	44.15	0.26	14.44	1.17	3,130.00	0.00	1.80	NaN



## VALEUR MANQUANTE

1

Valeur manquantes et infinies  
dans 132 pays

2

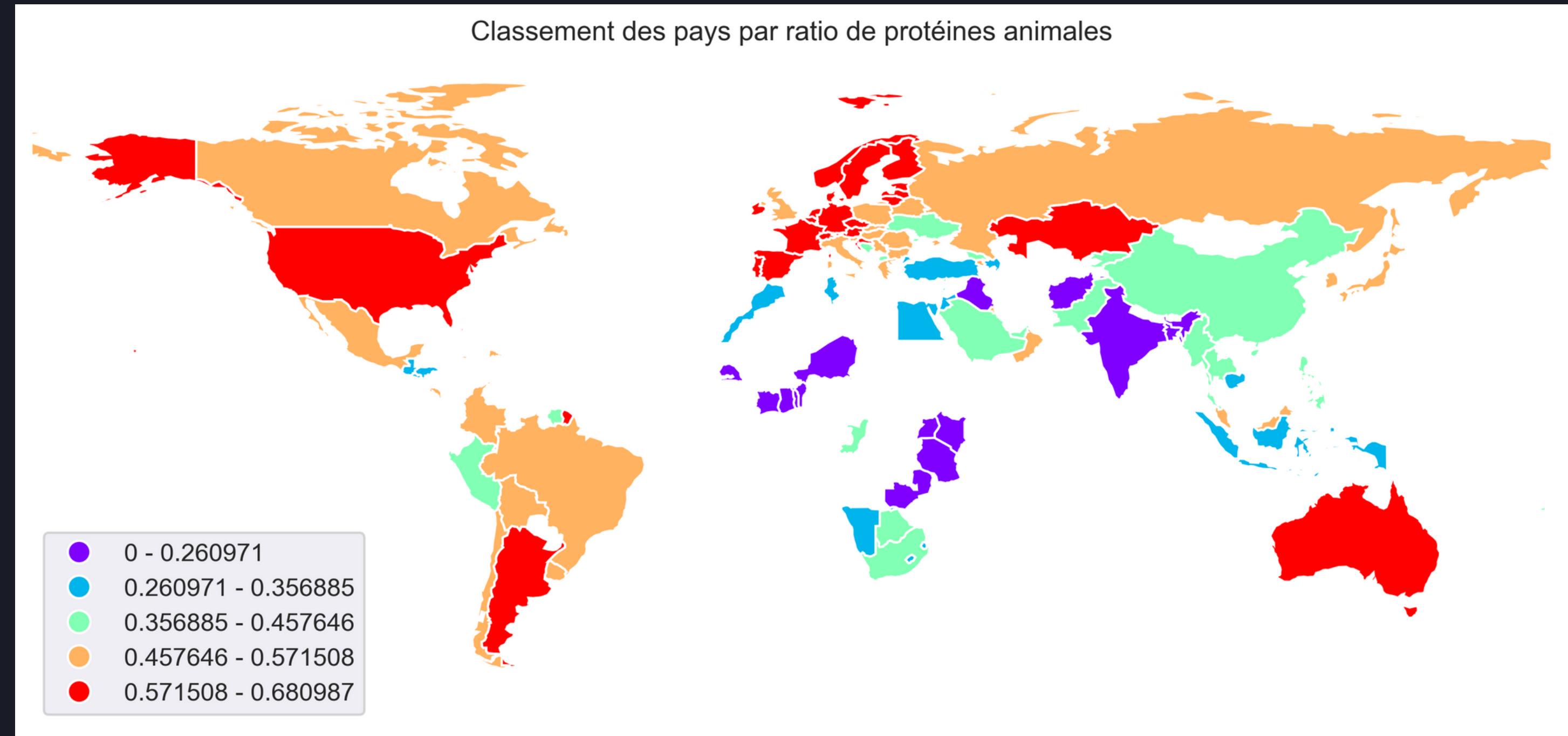
suppression des ligne  
concernées

3

106 pays après nettoyage



## GEOPLOT



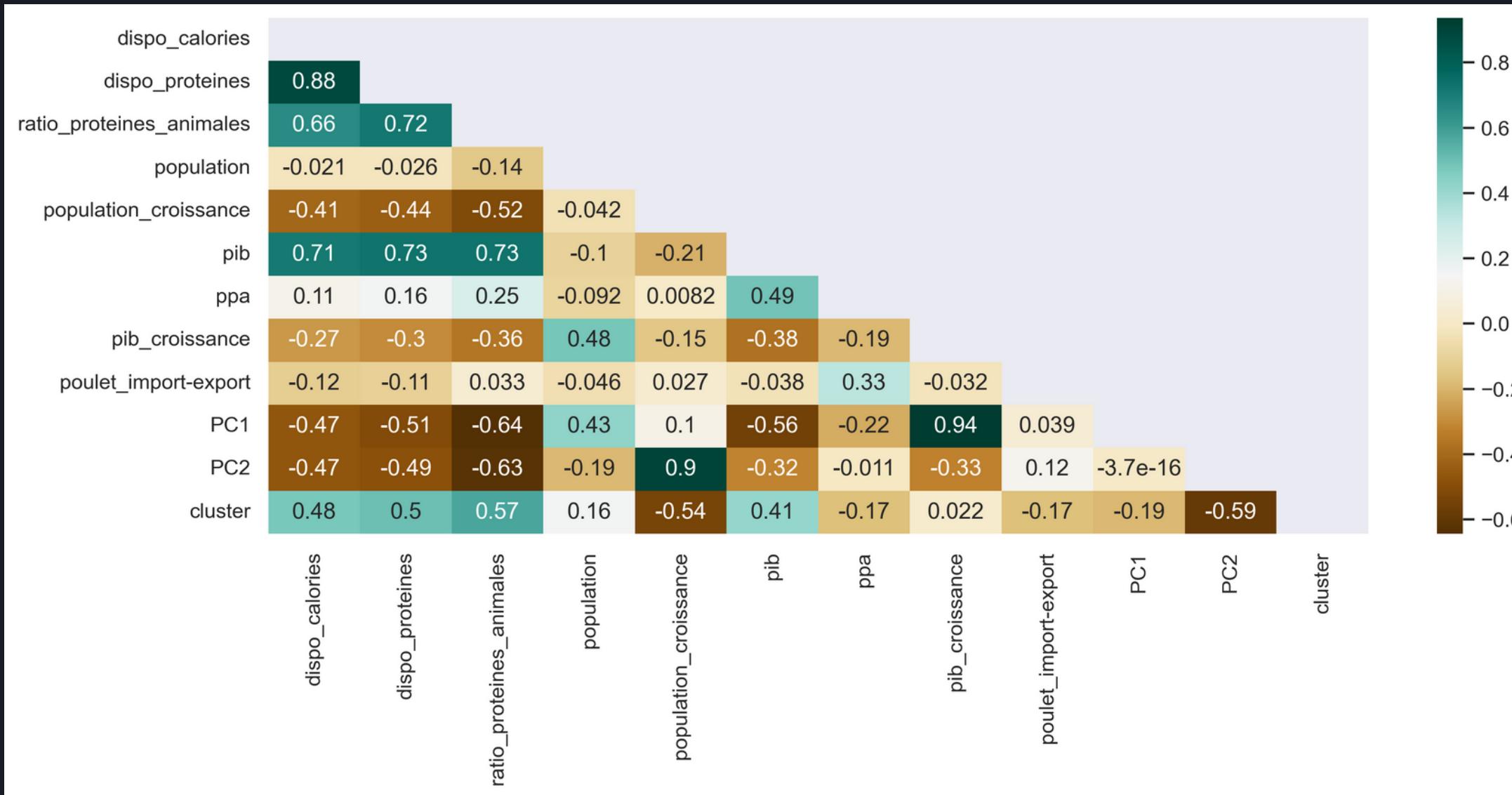


# ACP & CLASSIFICATION HIÉRARCHIQUE





## CORRÉLATIONS

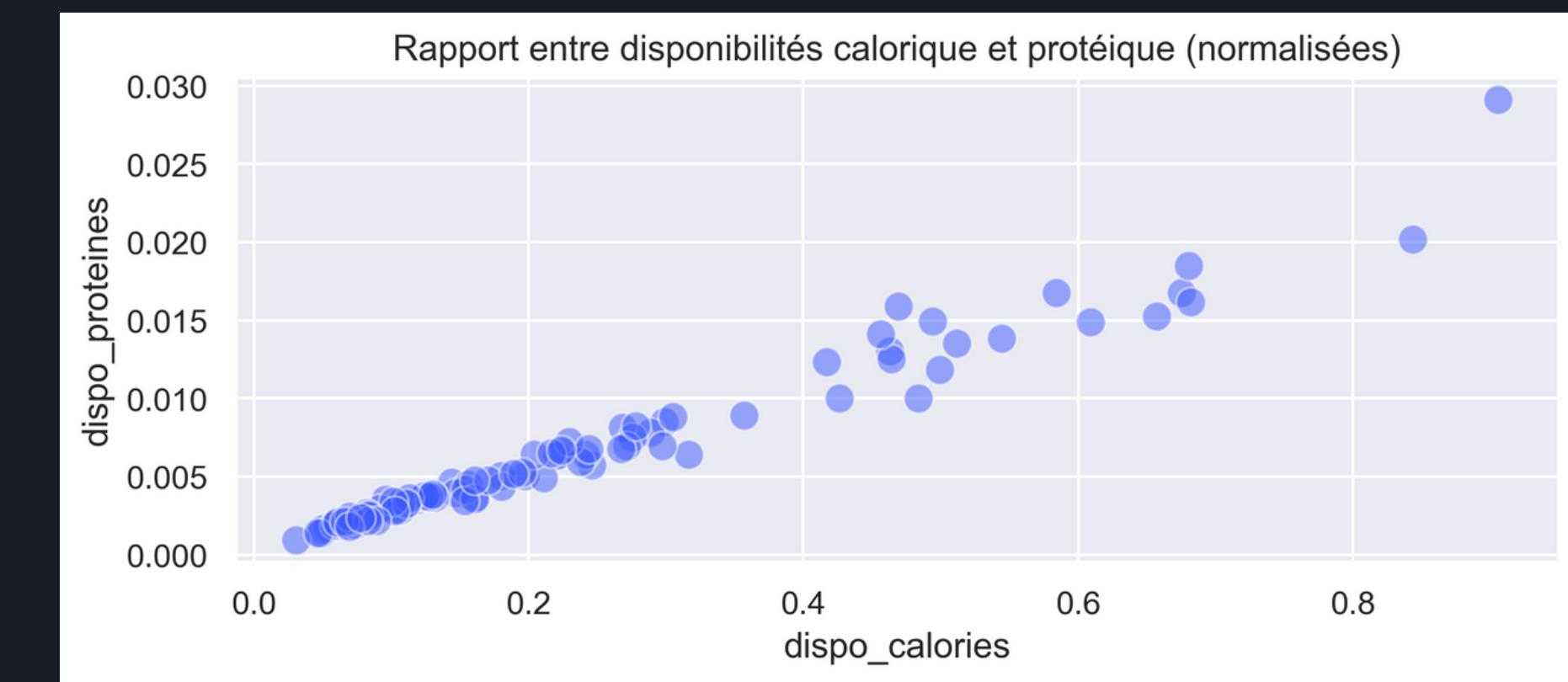
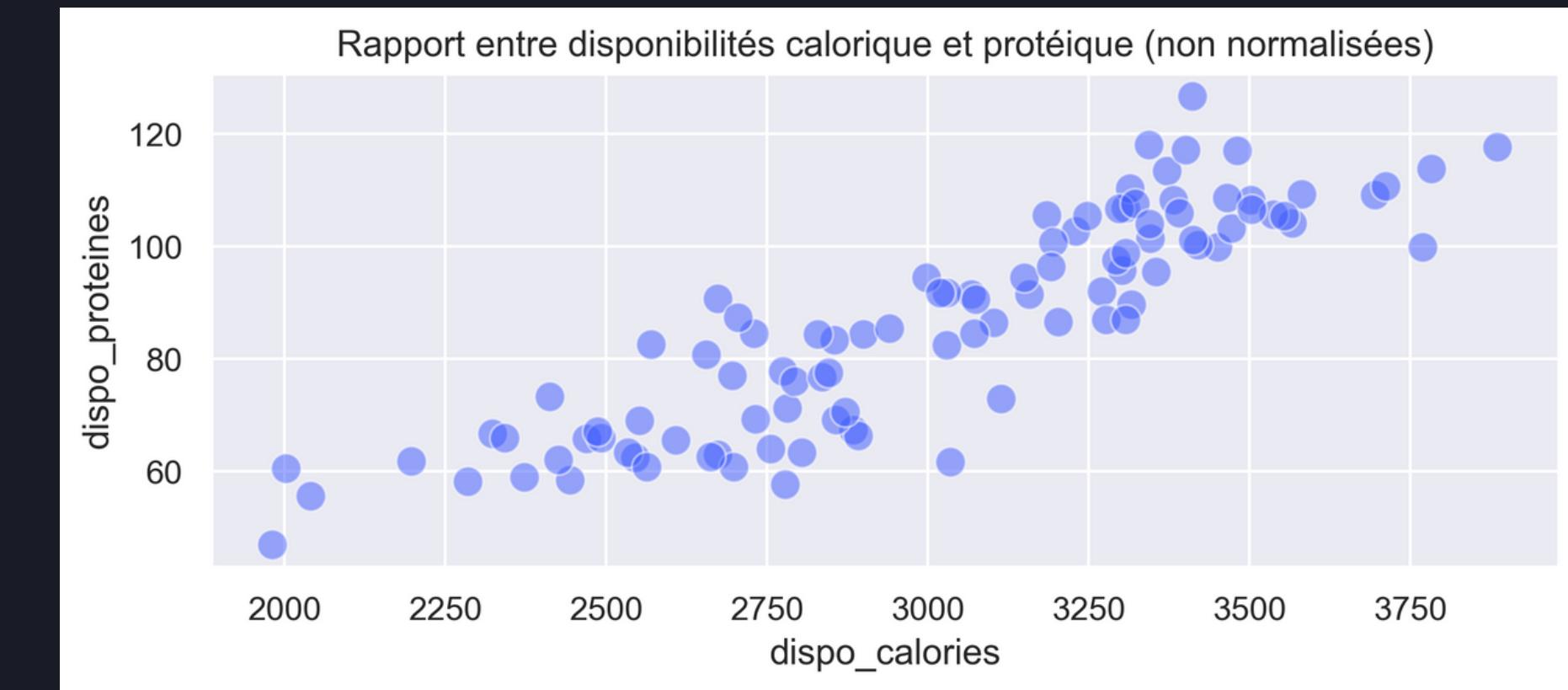


très peu de fort corrélations

la disponibilité en calories était  
écartée  
très corrélée à la disponibilité en  
protéines

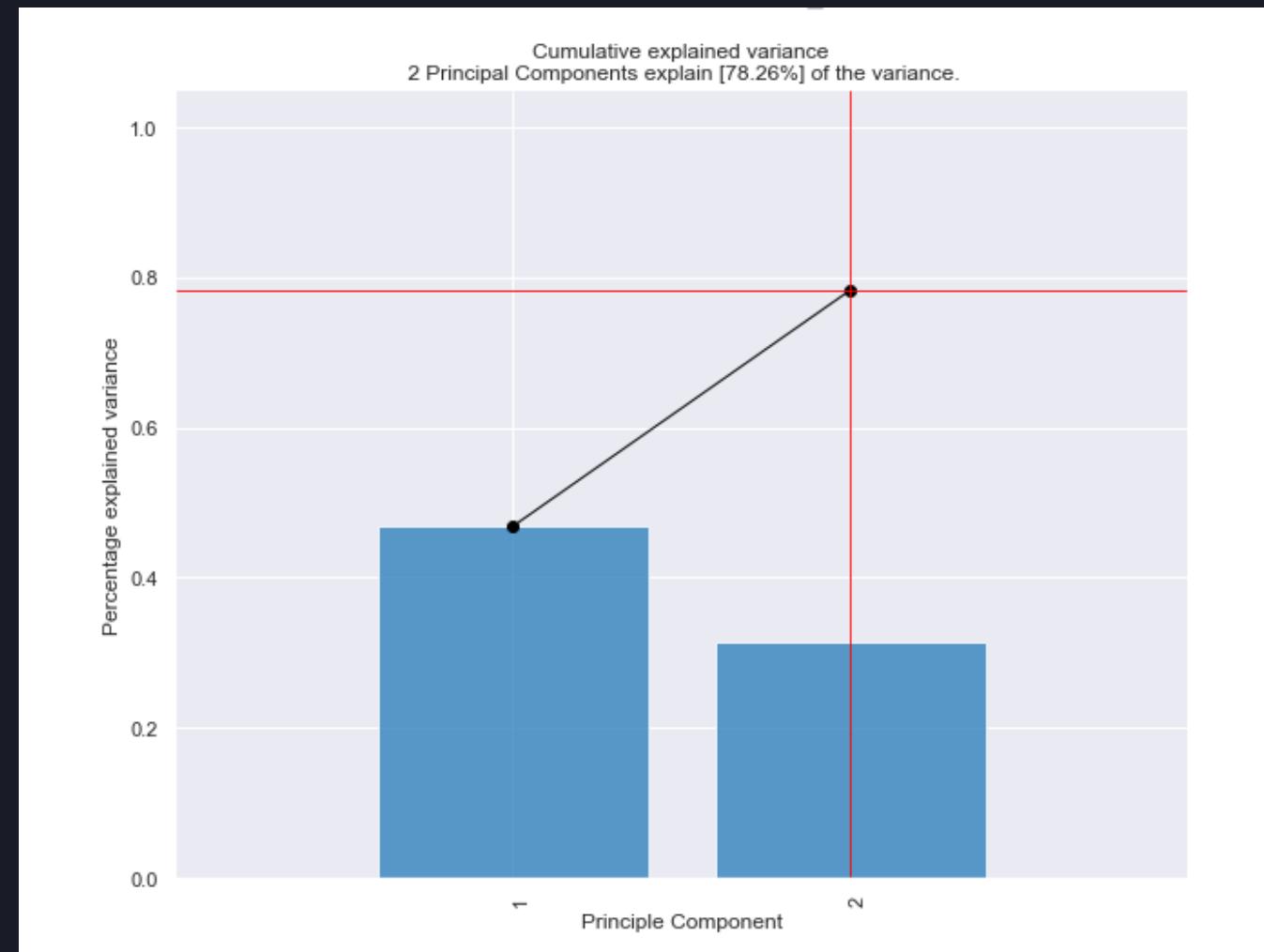


## NORMALISATION DES DONNÉES

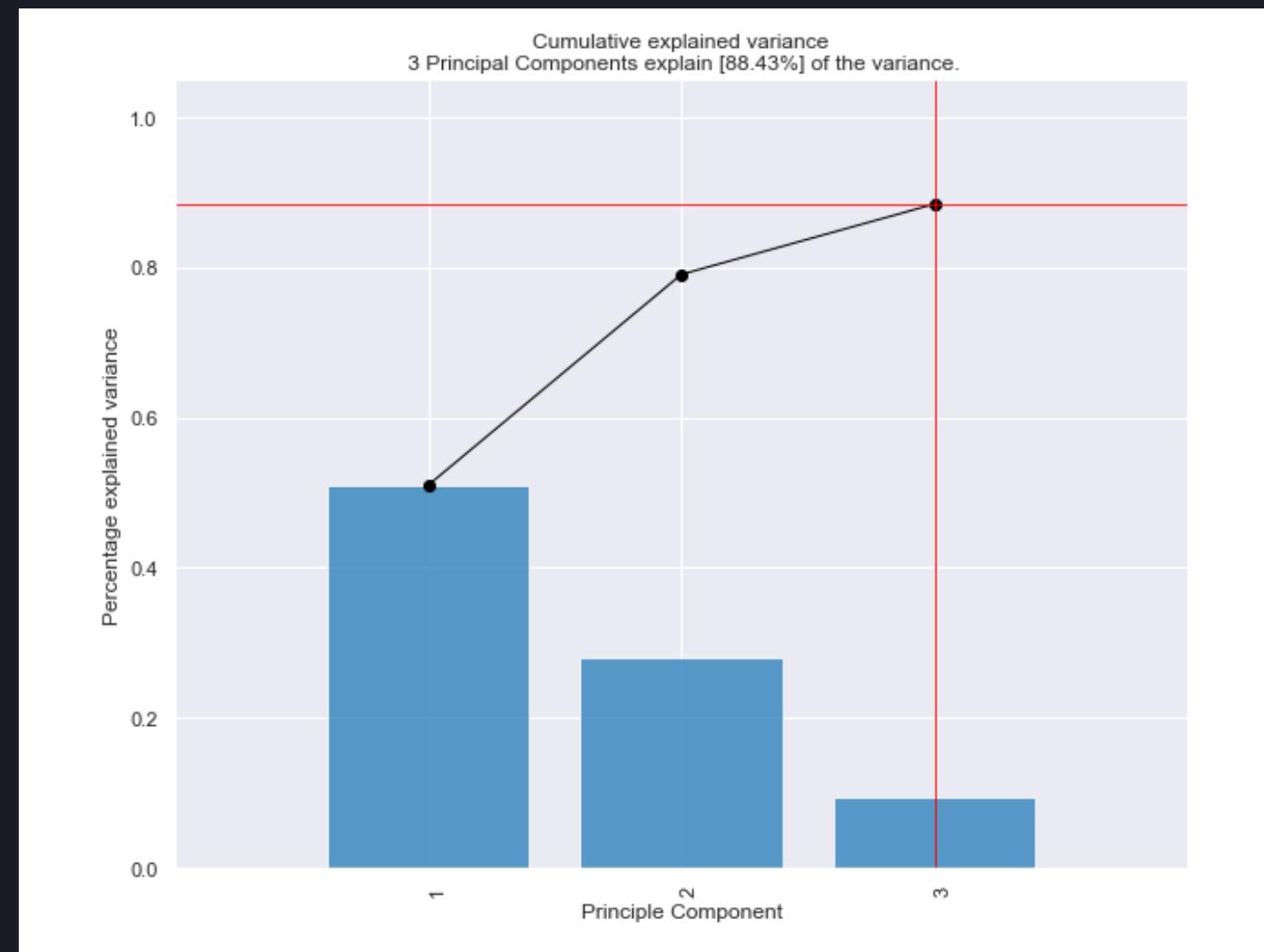




## ACP



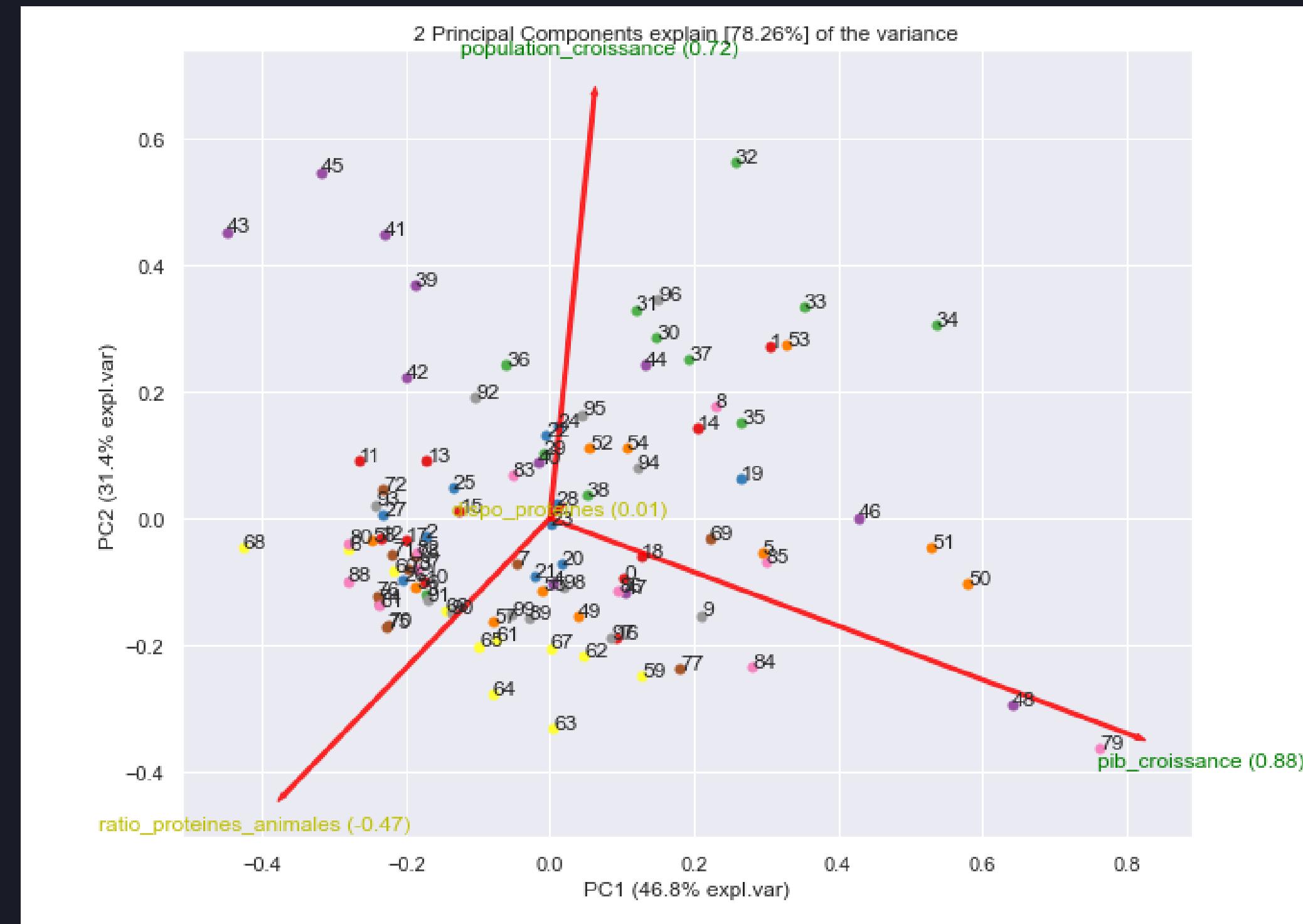
variables écartées :  
- Variables quantitatives  
- Disponibilité en calories



Variance expliquée :  
- 2 composantes : 78%  
- 3 composantes : 87%

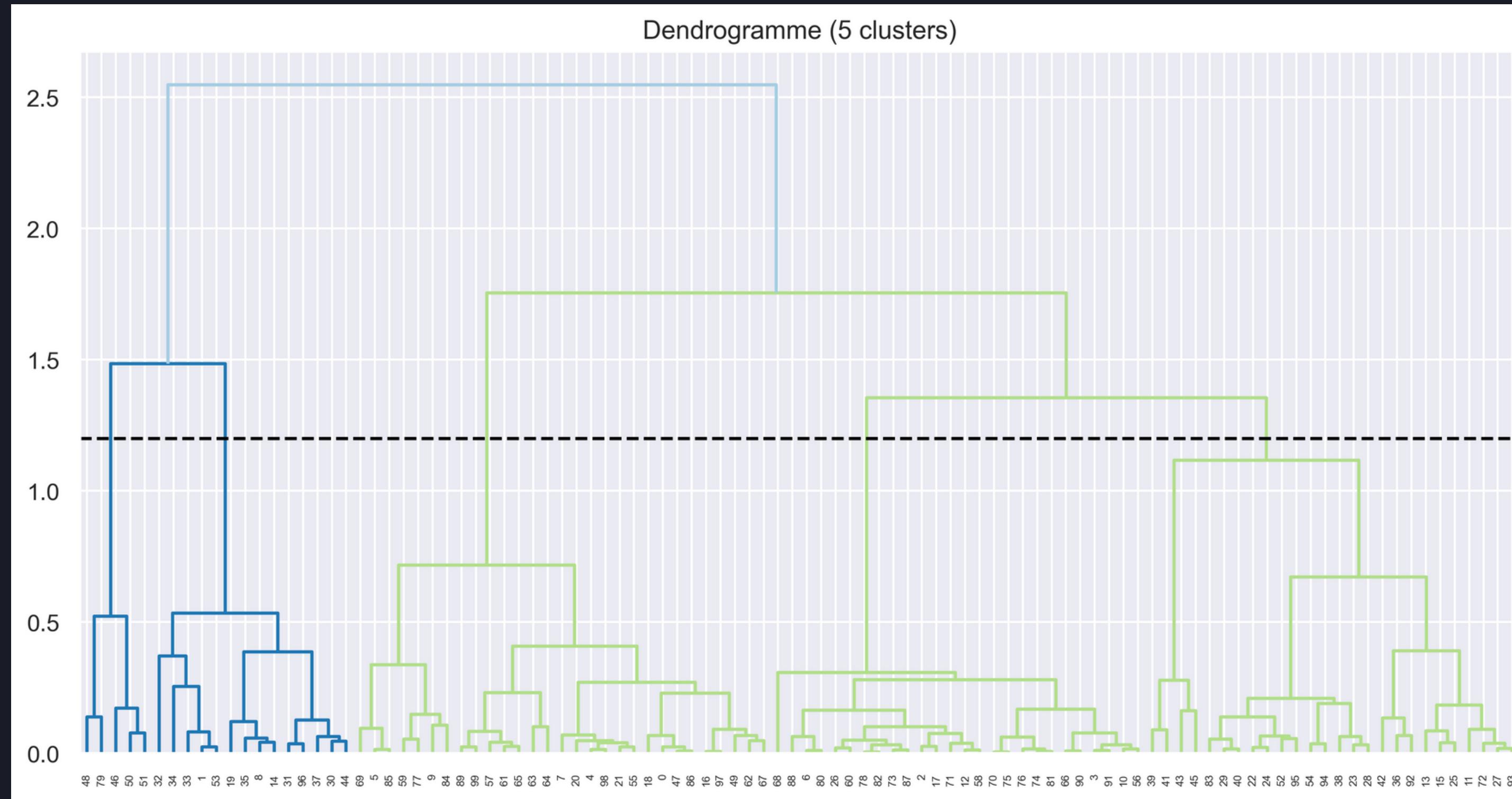


ACP



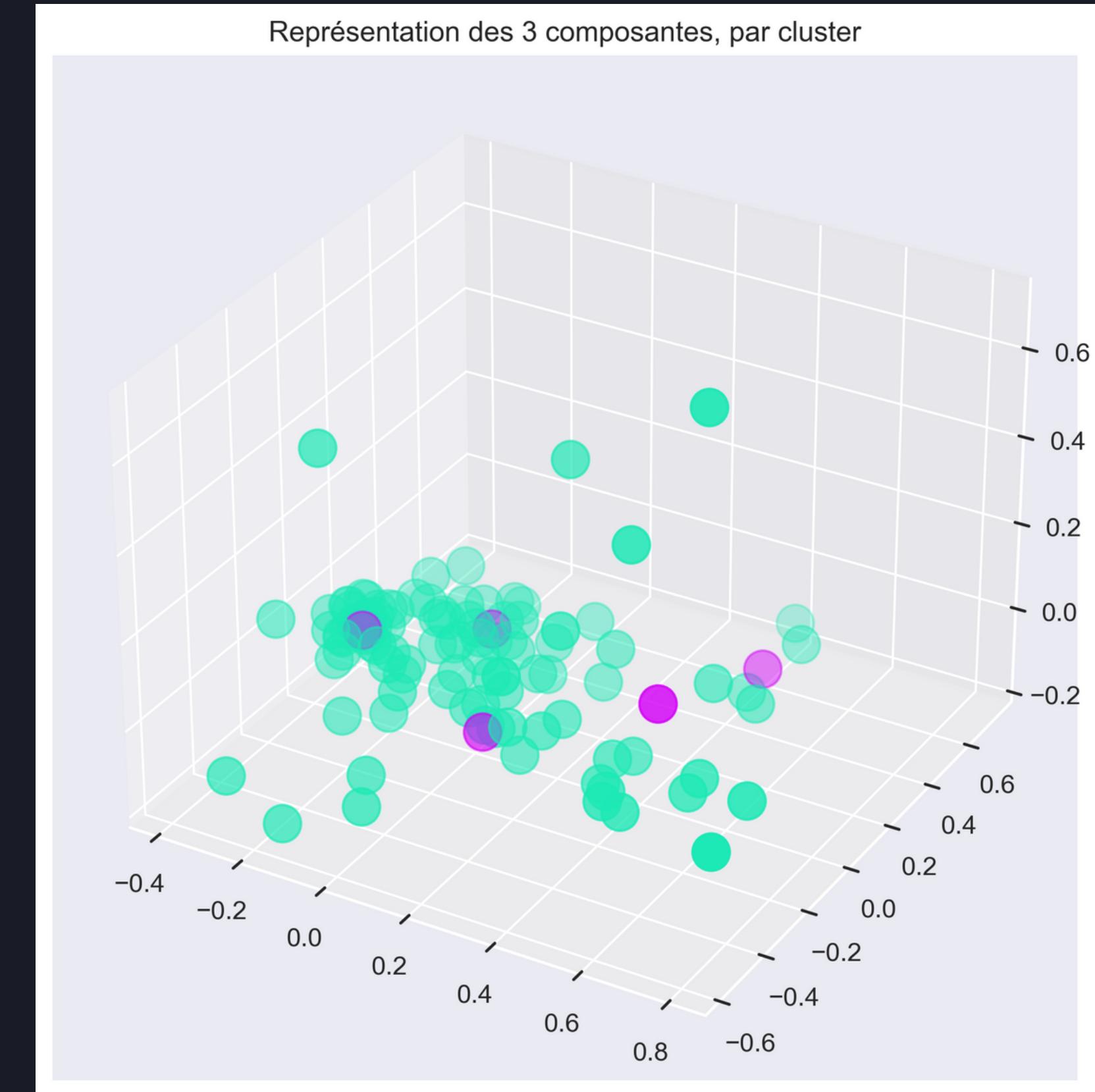


## DENDROGRAMME



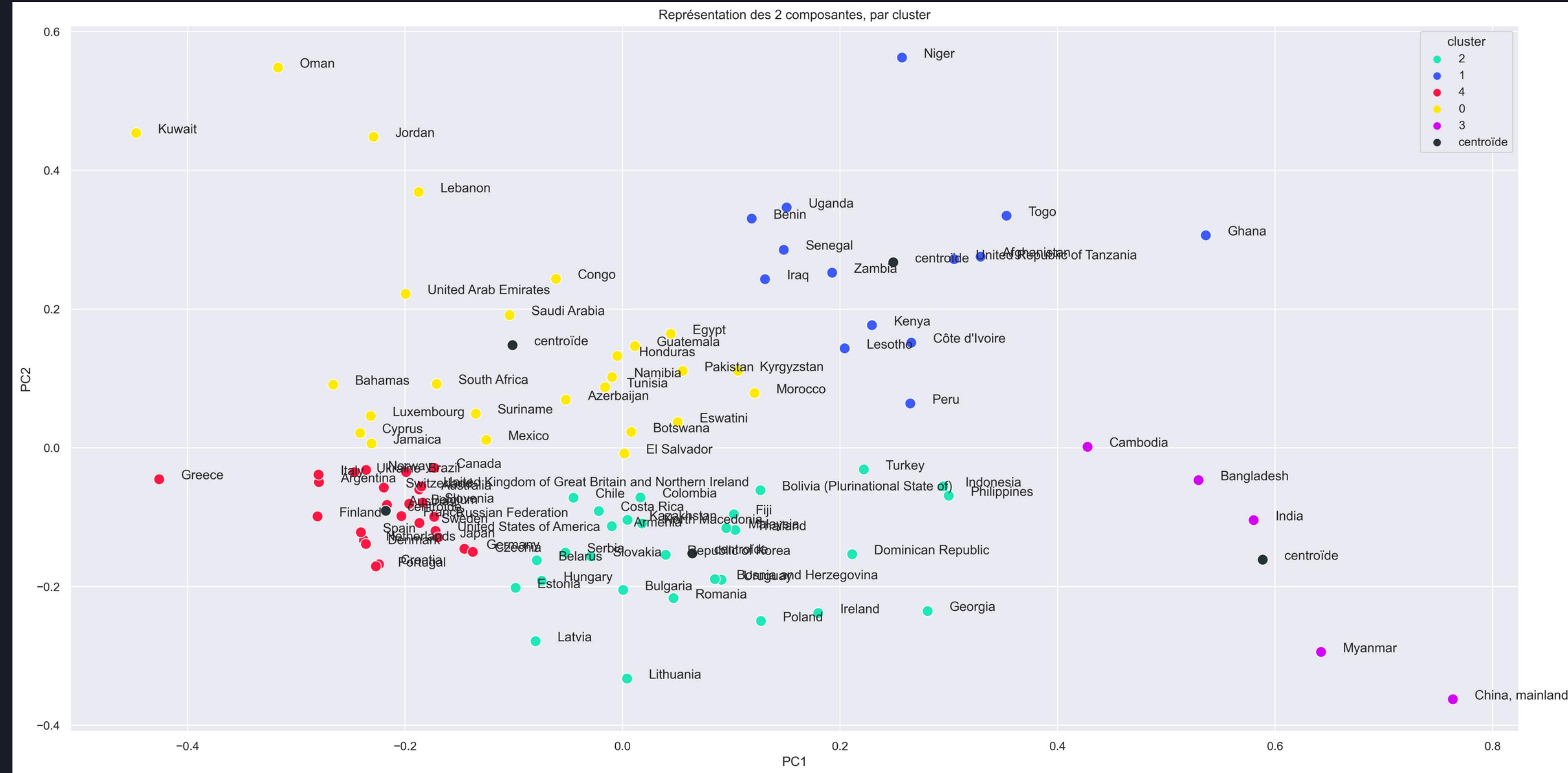


## VISUALISATION DES CLUSTERS





# VISUALISATION DES CLUSTERS





# TEST STATISTIQUE



## ● TEST STATISTIQUE

Test d'adéquation à la loi normal

```
: y = df['dispo_calories']
w,p = stats.shapiro(y)
print("Shapiro-Wilk test statistic, W:", w, "\n", "p-value:", p)
```

```
Shapiro-Wilk test statistic, W: 0.9773944616317749
p-value: 0.08313444256782532
```

## ● TEST STATISTIQUE

test de comparaison entre deux population dans le cas gaussienne

```
[5]: # il faut trouver une variable qui suit la loi normal dans deux cluster different
from scipy.stats import shapiro
shapiro(cluster_1)

ShapiroResult(statistic=0.9553747773170471, pvalue=0.6467816829681396)

[6]: shapiro(cluster_4)

ShapiroResult(statistic=0.935793399810791, pvalue=0.10654600709676743)

[7]: # égalité des variancce
from scipy.stats import bartlett
bartlett(cluster_1, cluster_4)

BartlettResult(statistic=2.4414756442102568, pvalue=0.11816501879882979)

[8]: from scipy.stats import ttest_ind
ttest_ind(cluster_1, cluster_4, equal_var=True)

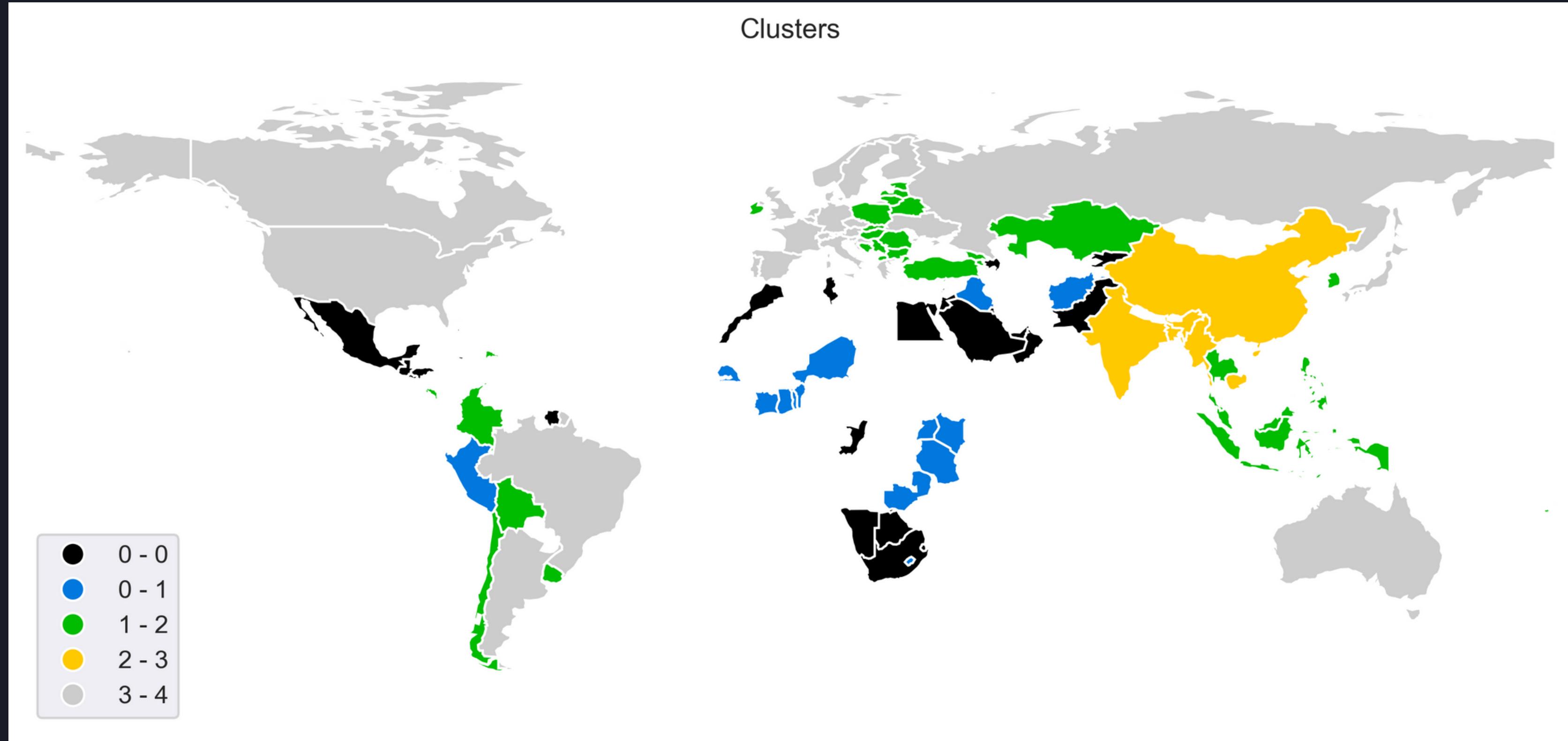
Ttest_indResult(statistic=-10.429197005822525, pvalue=1.048146988633356e-12)
```

# ANALYSE DES GROUPE



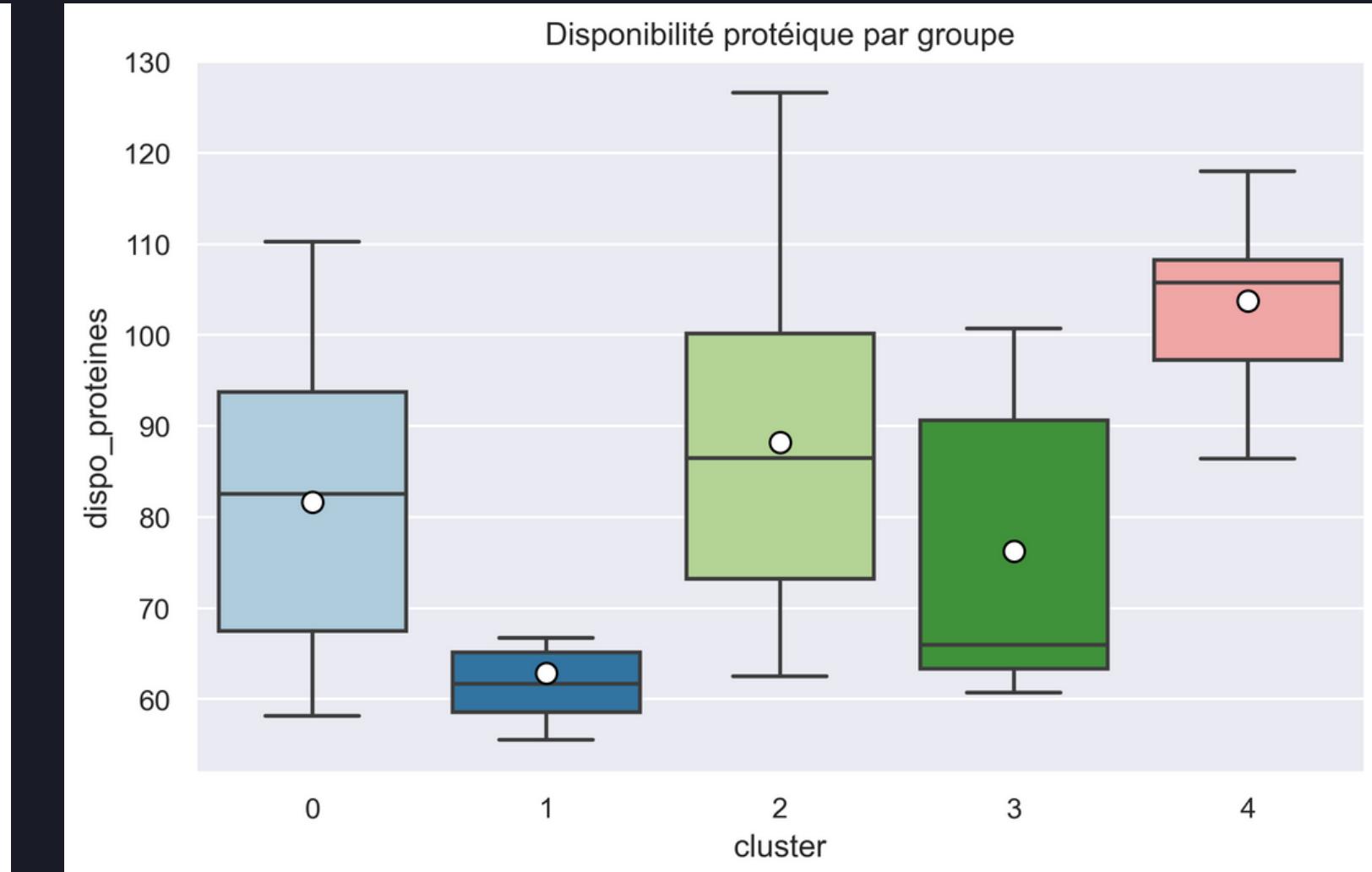
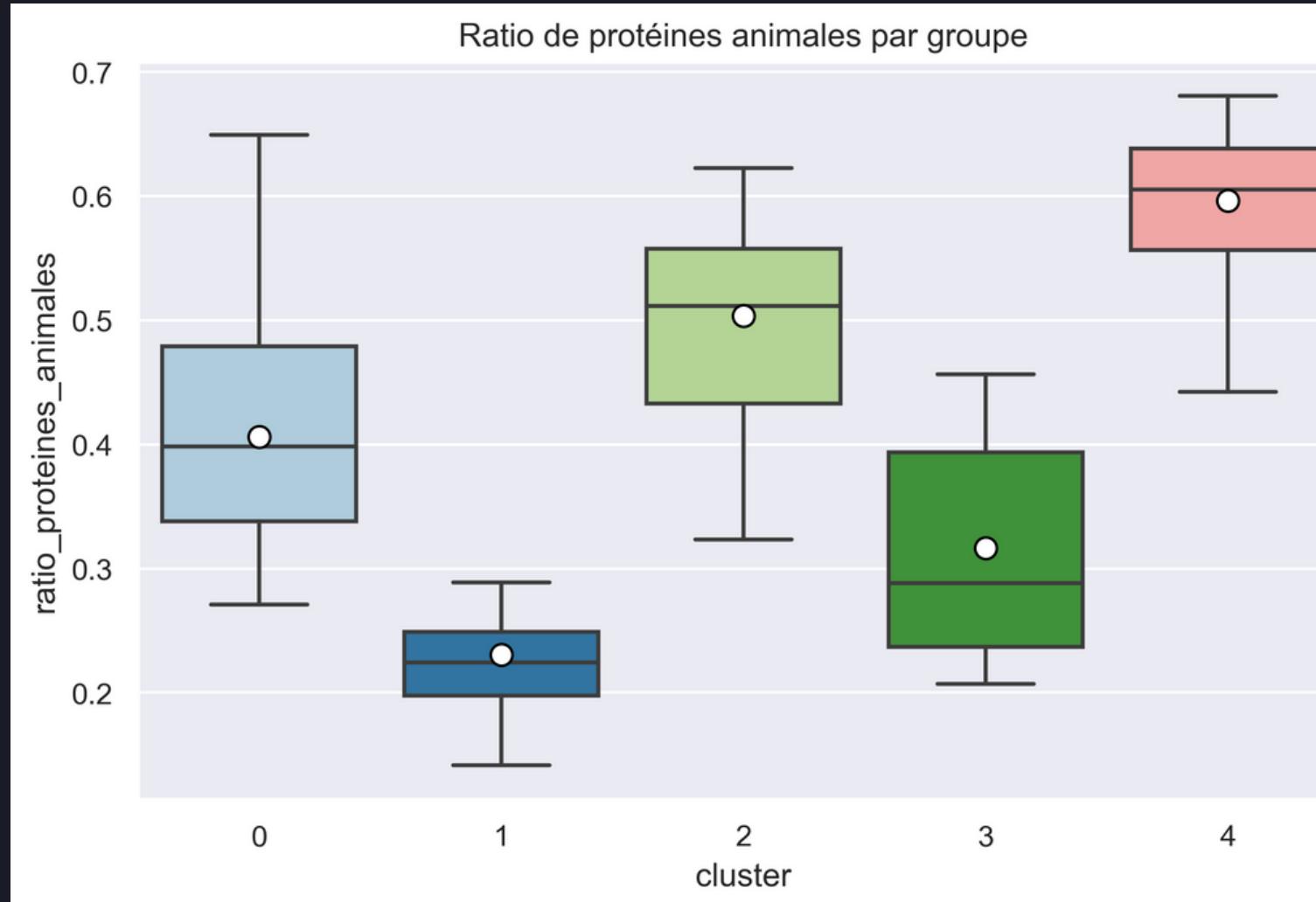


## VISUALISATION DES CLUSTERS





## INDICATEUR PROTEIQUE



Cluster 1:

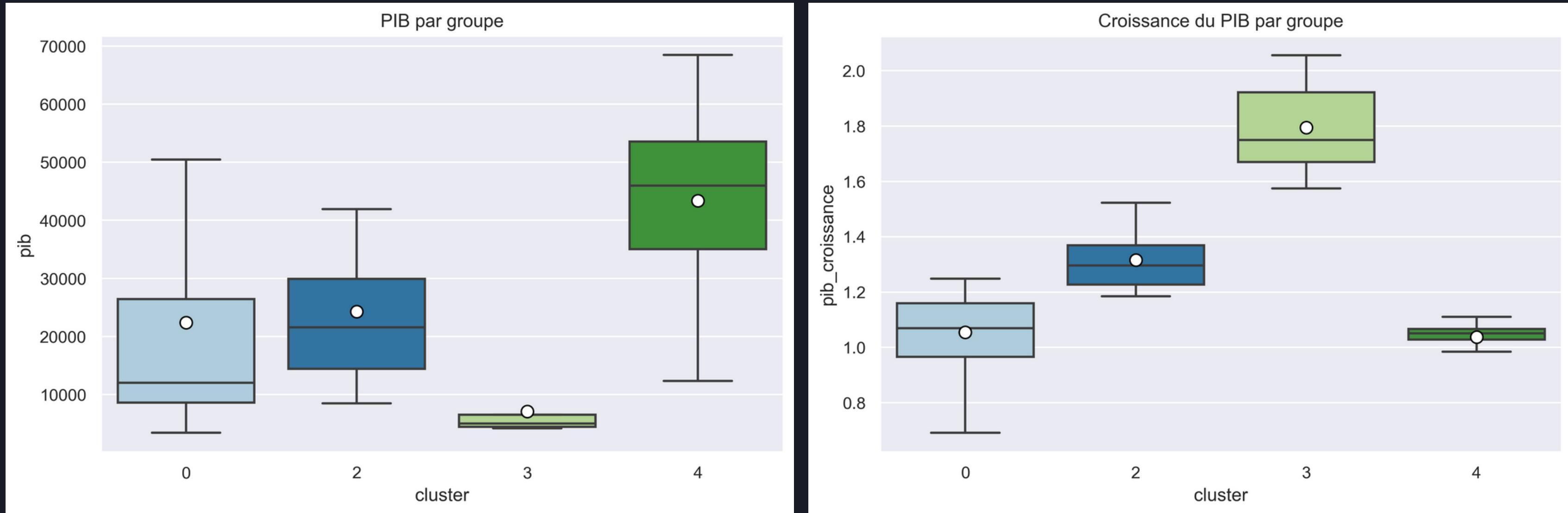
14 pays écartés

Tanzanie, Kenya, Lesotho,  
Peru, Senegal, Benin, Niger,  
Togo, Ghana, Côte d'Ivoire,  
Zambie, Iraq, Afghanistan,  
Uganda





## INDICATEUR DE PIB

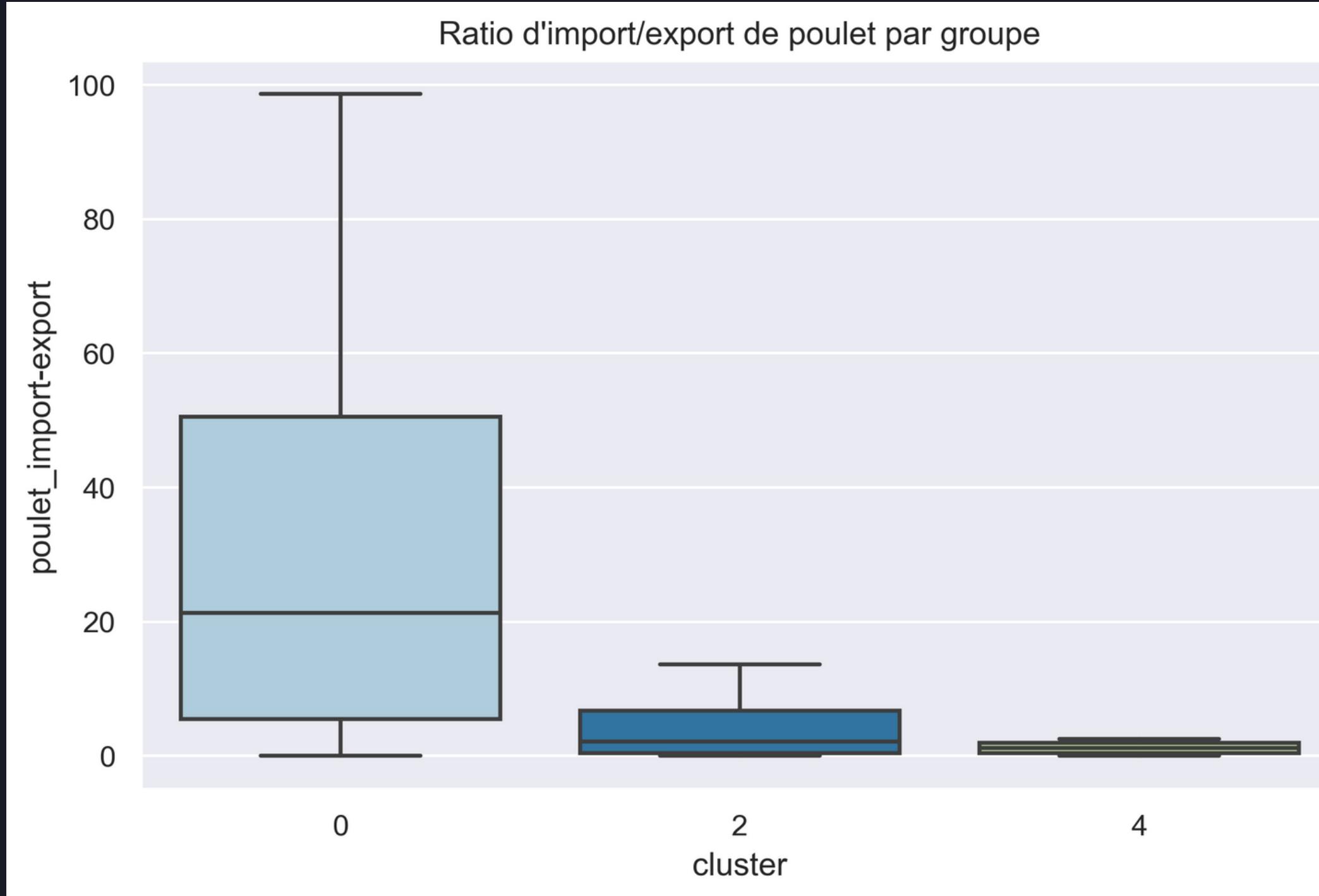


Cluster 3:

5 pays écartés  
Cambodge, Myanmar, Inde,  
Bangladesh, Chine



## PRODUCTION / IMPORT / EXPORT

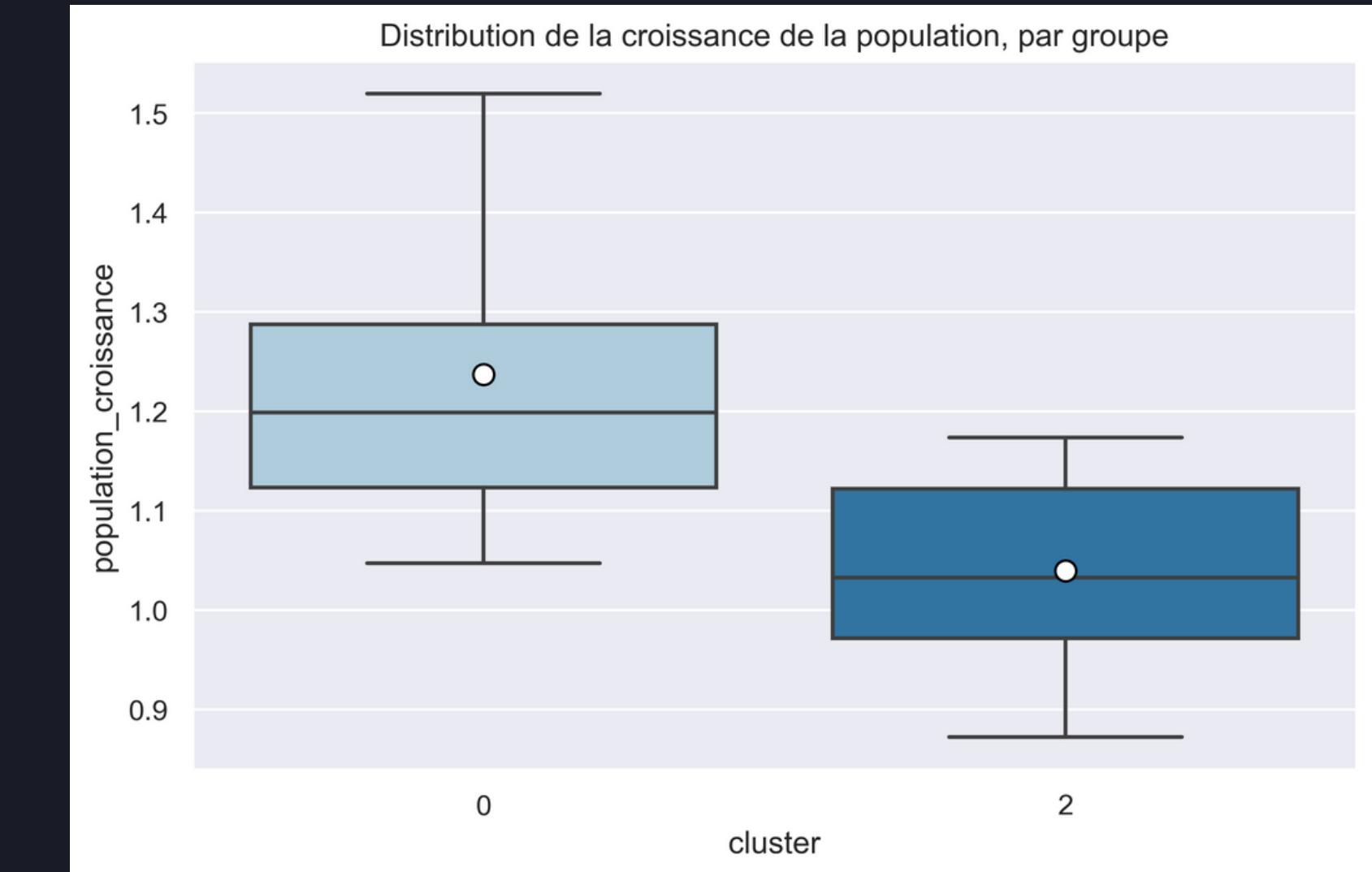
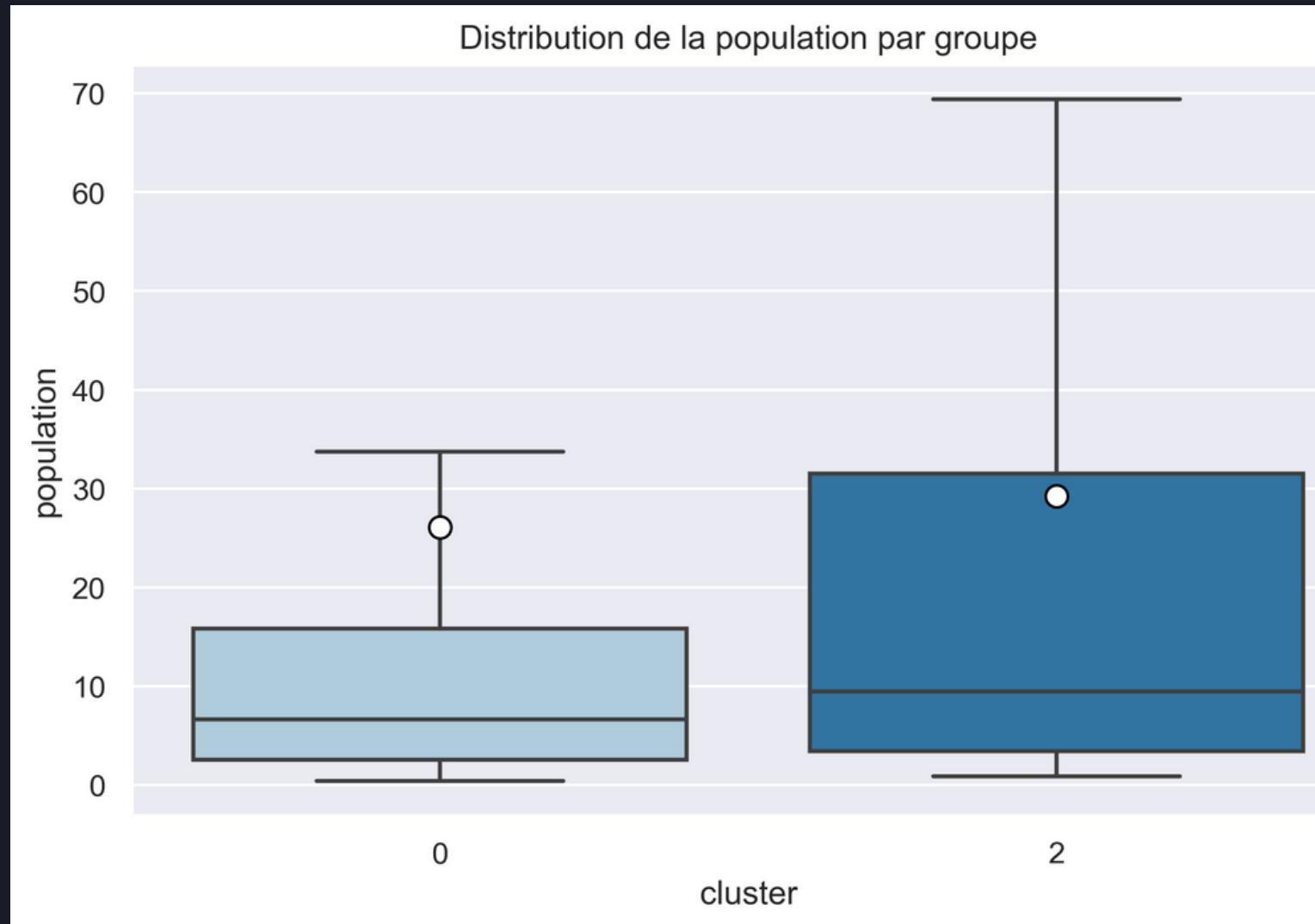


Cluster 4 :  
26 pays écartés  
Canada, Etats-Unis, Argentine,  
Russie, Norvège  
Brésil, France, Suède, Ukraine,  
Autriche, Allemagne, Grèce,  
Croatie, Suisse, Belgique, Pays-  
Bas, Portugal, Espagne,  
Australie, Italie, La Grande-  
Bretagne et l'Irlande, Slovénie,  
Finlande, République tchèque,  
Japon





## INDICATEURS DÉMOGRAPHIQUES



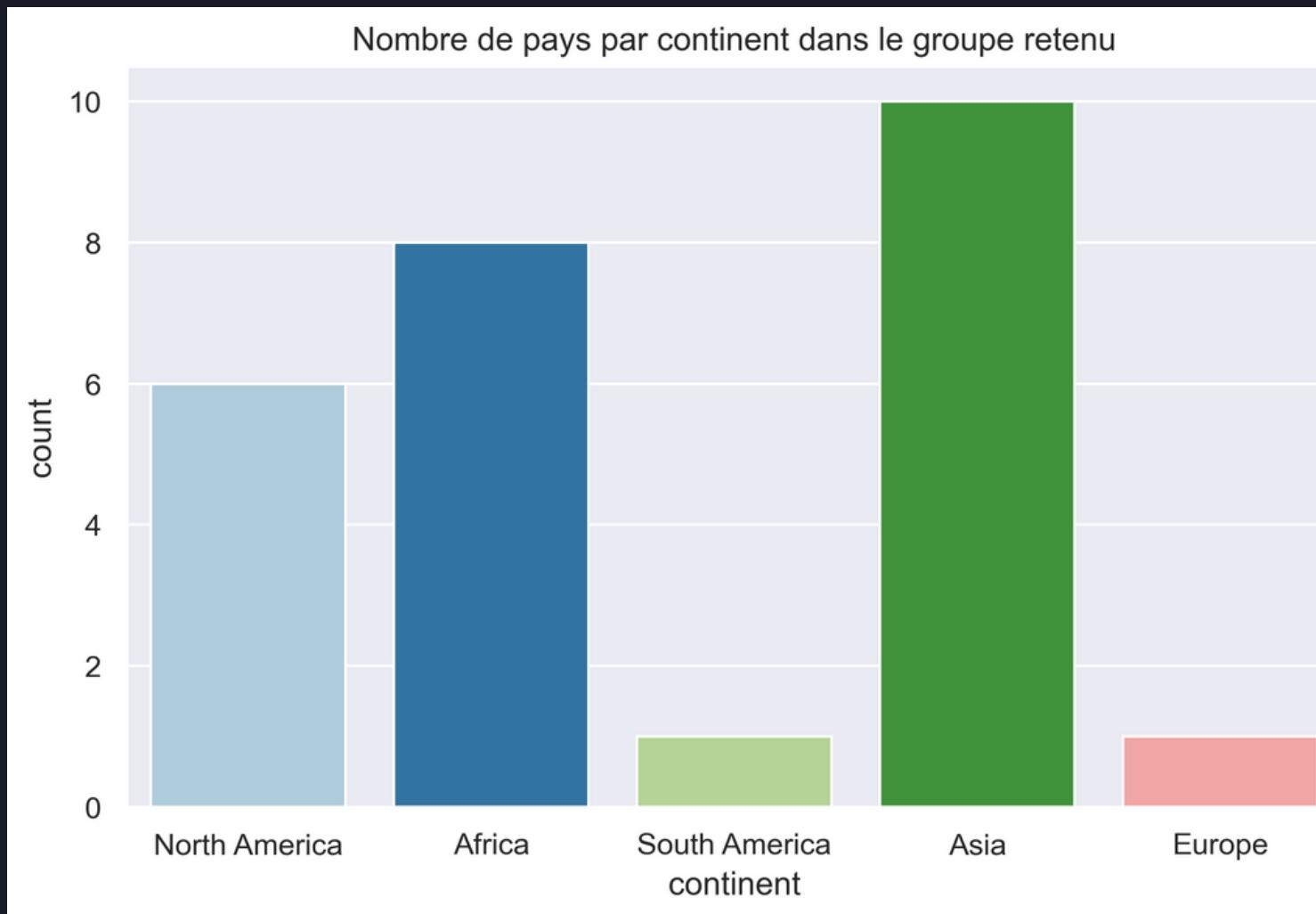
Cluster 2 :  
29 pays écartés



Fiji, Kazakhstan, Indonésie, Chili, République Dominicaine, Bolivie, Colombie, Costa Rica, Thaïlande, République de Corée, Arménie, Biélorussie, Pologne, Hongrie, Roumanie, Lituanie, Lettonie, Estonie, Bulgarie, Turquie, Irlande, Géorgie, Philippines, Malaisie, Slovaquie, Bosnie-Herzégovine, Macédoine du Nord, Serbie



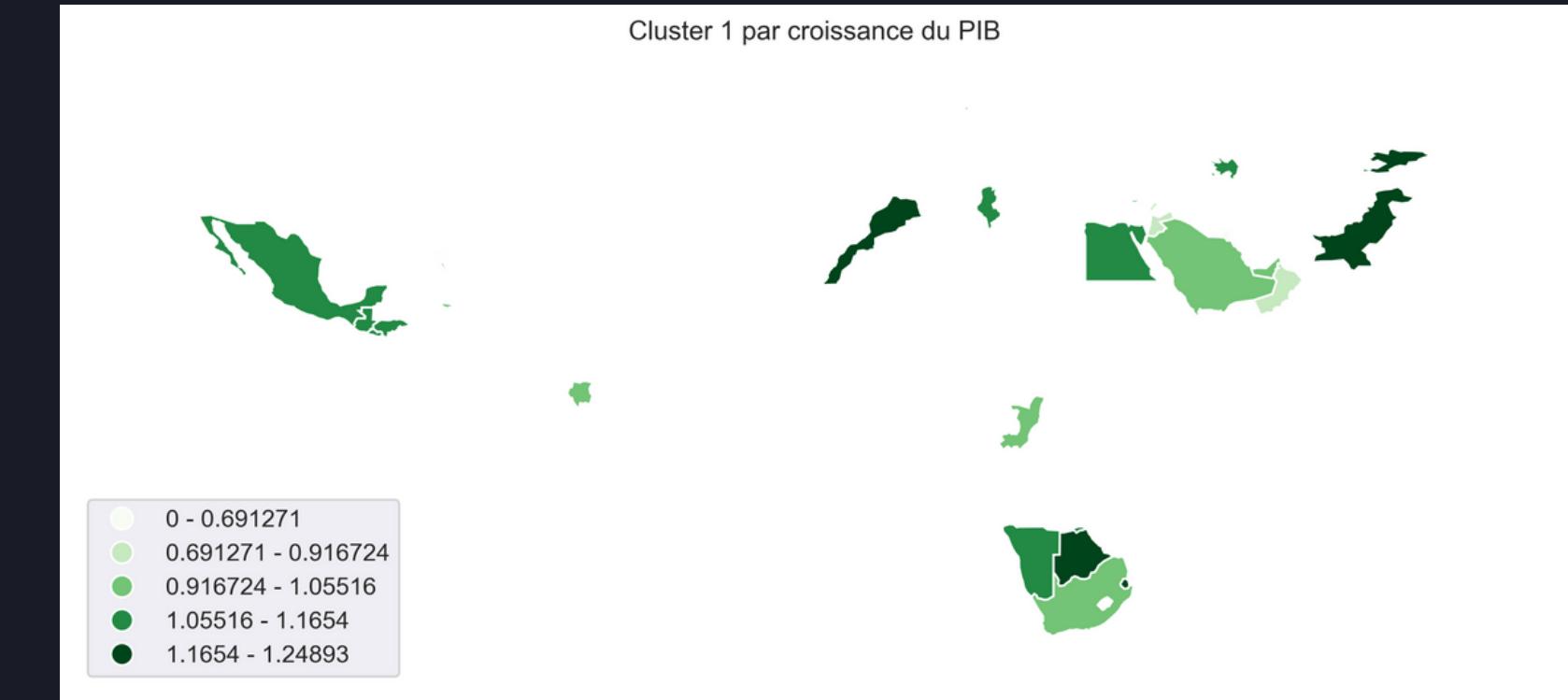
## LES GROUPE CHOISI



Cluster 0:  
26 pays  
Bahamas, Afrique du Sud,  
Mexique, Honduras, Salvador,  
Guatemala, Suriname,  
Jamaïque, Botswana, Namibie,  
Congo, Swaziland, Liban,  
Tunisie, Jordanie, Les Emirats  
Arabes Unis, Koweït, Oman,  
Pakistan, Kyrgyzstan,  
Luxembourg, Azerbaijan,  
Arabie saoudite, Chypre,  
Maroc, Egypte

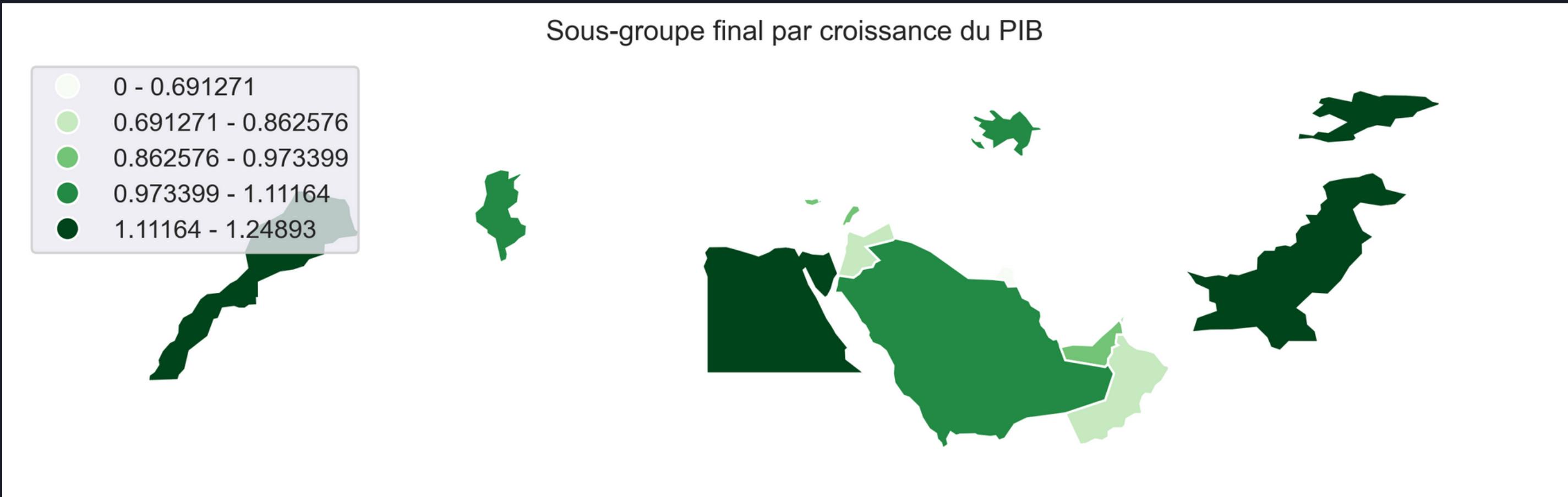


## ANALYSE DU GROUP





## GROUP FINAL



Liste des 10 pays sélectionner :

Maroc , Tunisie, Egypte, Chypre, Emirats Arabe Unis, Arabie saoudite, Oman, Liban, Jordanie, Koweït

# CONCLUSION





## RÉSUMER



Analyse sur 83 % de la population mondiale



ACP à 78% de variance expliquée



5 cluster par classification hiérarchique



## RECOMMANDATIONS

1

Cibler 10 pays du Maroc à La Jordanie

2

Former des équipe local arabophone et anglophone

3

crée une filiale / sous-marque adaptée au coutume du pays en question

Avez-vous des  
questions ?