# COUNTRY CLUSTERING ASSIGNMENT

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NGO has received funds worth $10 Million and are looking to help out affectively and financially , the countries in dire need of aid

PROBLEM STATEMENT

Cluster Analysis and Model
Here we have attempted to cluster the countries based on two methodologies:

1.  K means Clustering:- finding the Optimal number of clusters using elbow curve and silhouette analysis. It seems this methodology had better clustering performance than Hierarchical clustering. Here in the Cluster where the countries in dire need are,  Afghanistan, Madagascar, Uganda, hana, Mali etc.

2.  Hierarchical Clustering:-Using Single Linkage to get the clusters as far apart from each other, The clustering caused irregularities, like having only 1-2 countries in the clusters. Here in the Cluster where the country is in dire need, we only have one, ie Nigeria.

# K Means Clusters and some Countries under them

CLUSTER 1 -> Austria, Belgium, Brunei, Canada, Finland, France, Italy, Kuwait, Malta, Netherlands, New Zealand, Norway, Qatar, Slovenia, Spain, Sweden, United Arab Emirates, United Kingdom etc.
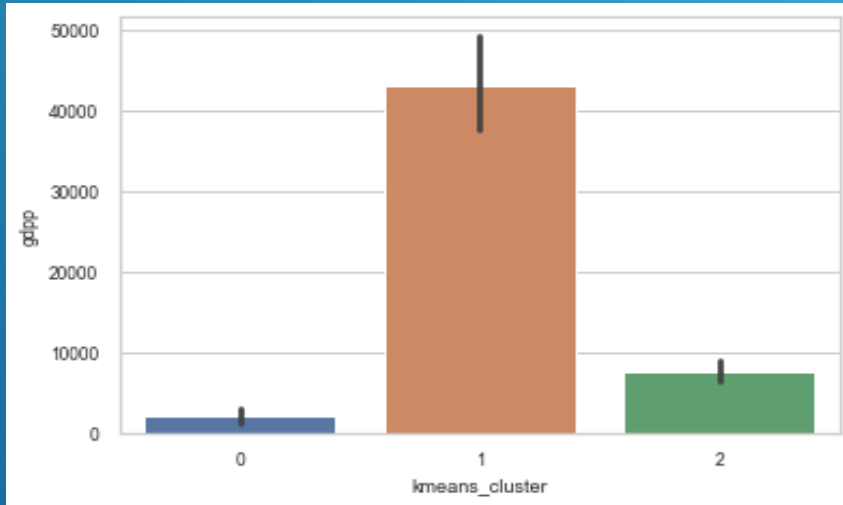
CLUSTER 0 -> Afghanistan, Angola, Botswana, Benin, Chad, Cameroon, Ghana, Guinea, Iraq, Kenya, Liberia, Mali, Mozambique, Nigeria, Pakistan, Senegal, Solomon Islands, Sudan, Tanzania, Togo, Uganda, Yemen, Zambia

CUSTER 2 -> Albania, Argentina, Bahrain, Bangladesh, Chile, China, Ecuador, Egypt, Guyana, Guatemala, India, Indonesia, Jamaica, Jordan, Lebanon, Libya, Malaysia, Maldives, Nepal, Oman, Peru, Paraguay, Romania, Russia, South Korea, Sri Lanka, Thailand, Tonga, Ukraine, Uruguay
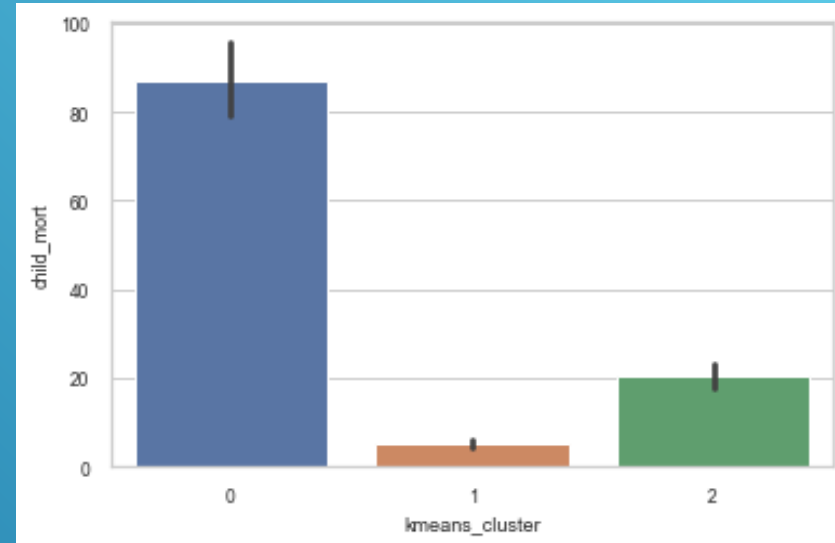
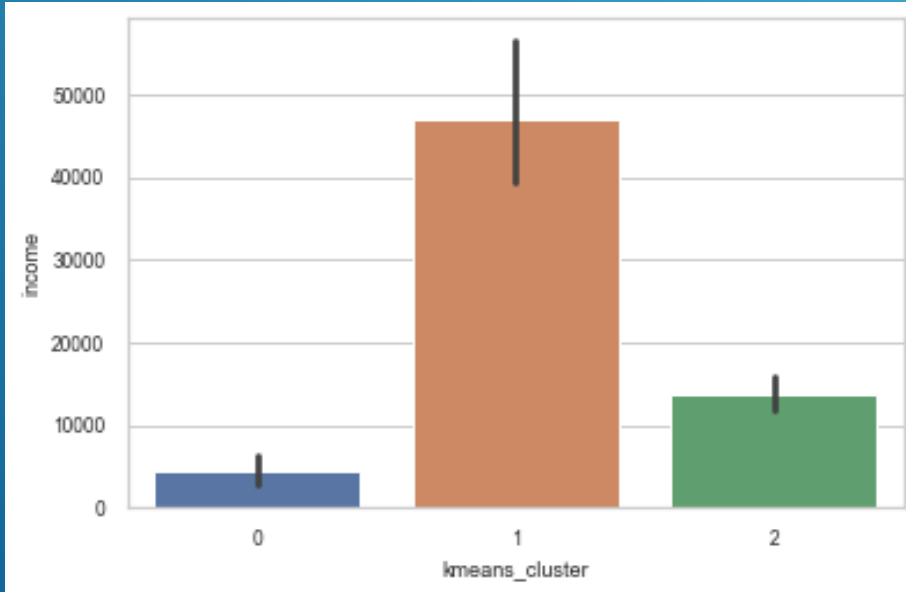# Findings of K means Clustering

☒ GDP

☒ Child Mortality





FINDINGS OF K MEANS CLUSTERING'S
WE COULD GET THE ABOVE AVERAGE FIGURES OF THE CLUSTERS,
COUNTRIES LIKE AFGHANISTAN, IRAQ, PAKISTAN SEEM TO HAVE A LOW
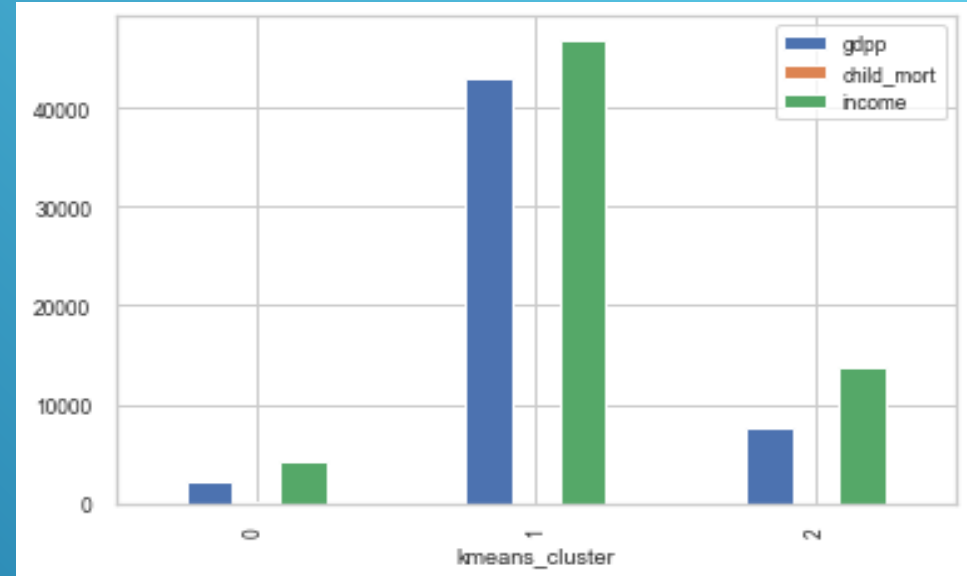GDPP AND HIGH DEATH OF CHILDREN UNDER AGE 5

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# Findings of K means Clustering's (Contd..)

⧠ Income:
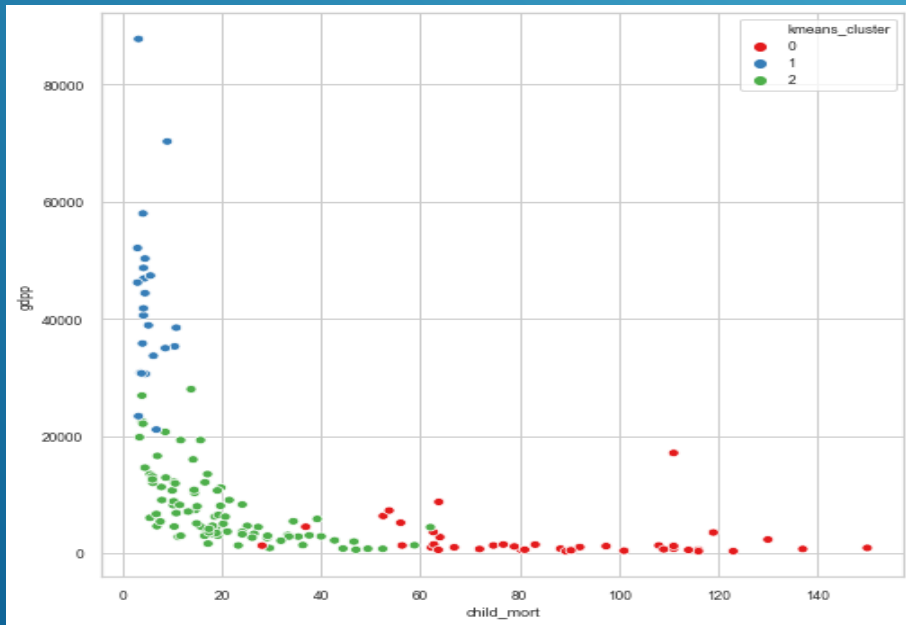
⧠ Average GDPP, Income, Child Mortality, Cluster Wise:





COUNTRIES LIKE AFGHANISTAN, IRAQ, MADAGASCAR SEEM TO HAVE LOWER AVERAGE INCOME AND NOT ENOUGH MONEY TO SPEND IN HEALTH DEPARTMENT.
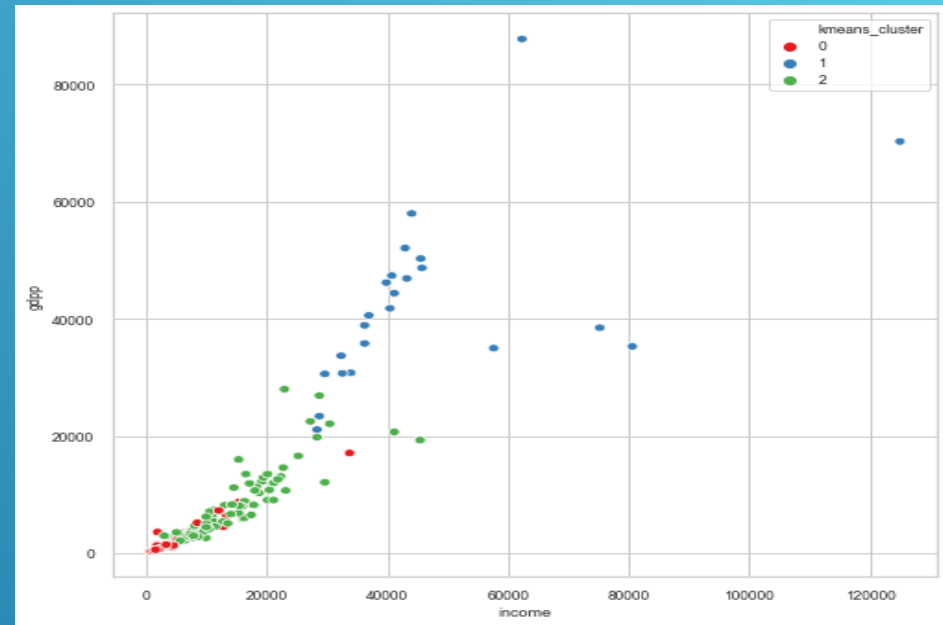
# Findings of K means Clusterings (Contd..)

- Scatter plot between Child_mort and GDPP, Cluster Wise Segmentation
- Scatter plot between Income and GDPP, Cluster Wise Segmentation

# Conclusion of K means Clustering

We Need to give contribution to countries like Afghanistan, Kenya, Madagascar (Cluster 1) in their Health and Business departments.
We could use some money to help these countries improve Their health infrastructure and also help them get some Jobs causing a rise in Income and Reducing the number of children dying under the age of 5.
Also we need, to look into the situation of educating them on population control, as these countries have high number of Children per family.

# Conclusion of K means Clustering Countries that need Help Immediately.

| Liberia | Burkina Faso | Pakistan | Kiribati |
|---|---|---|---|
| Congo Dem. Rep. | Uganda | Lao | Nigeria |
| Niger | Guinea | Mauritania | Congo Rep. |
| Mozambique | Tanzania | Cote dIvoire | Angola |
| Malawi | Mali | Solomon Islands | Timor-Leste |
| Togo | Benin | Cameroon | Iraq |
| Guinea-Bissau | Comoros | Ghana | Namibia |
| Afghanistan | Chad | Yemen | Botswana |
| Gambia | Kenya | Zambia | South Africa |
| Rwanda | Senegal | Sudan | Gabon |

# Hierarchical Clusters and Some Countries under them

CLUSTER 0 - > Afghanistan, Albania, Bangladesh, Barbados, Cameroon, Cambodia, Ecuador, Egypt, Fiji, Gabon, Ghana, Hungary, India, Indonesia, Iran, Iraq, Kenya, Kiribati, Latvia, Libya, Malaysia, Maldives, Nepal, Niger, Oman, Pakistan, Paraguay, Russia, Romania, Saudi Arabia, South Africa, Thailand, Turkey, Uruguay, Ukraine, Vietnam, Yemen, Zambia etc.
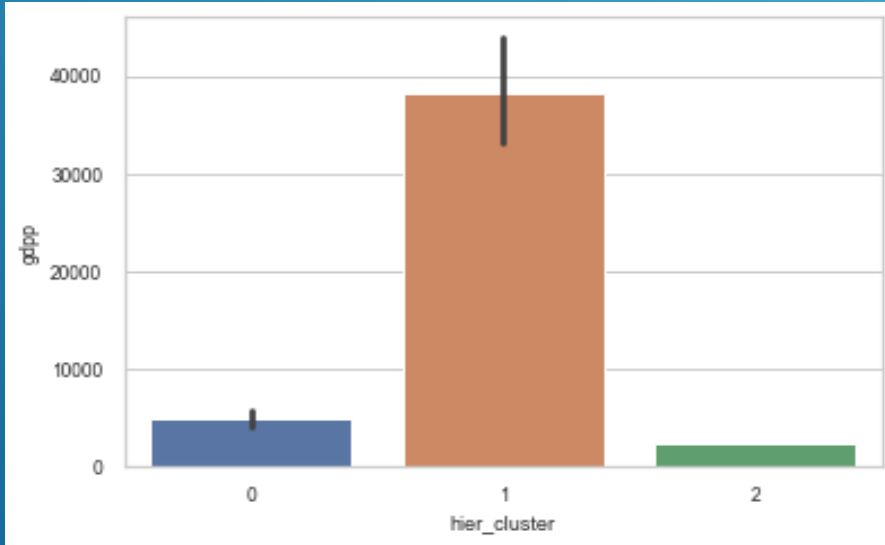CLUSTER 1 - > Austria, Bahrain, Canada, Denmark, Finland, Germany, Ireland, Kuwait, Netherlands, Norway, Portugal, Qatar, Slovenia, Spain, United Arab Emirates, United Kingdom etc.
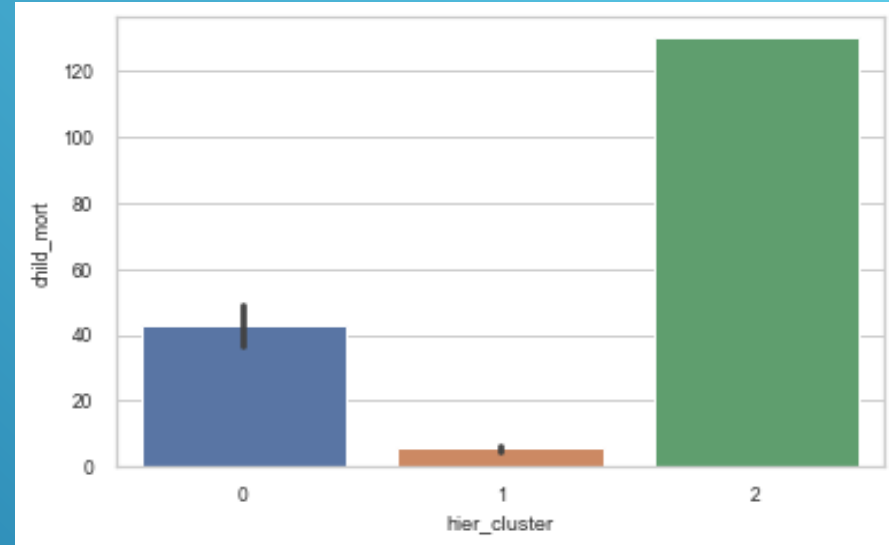CLUSTER 2 - > Nigeria

# Findings of Hierarchical Clustering's
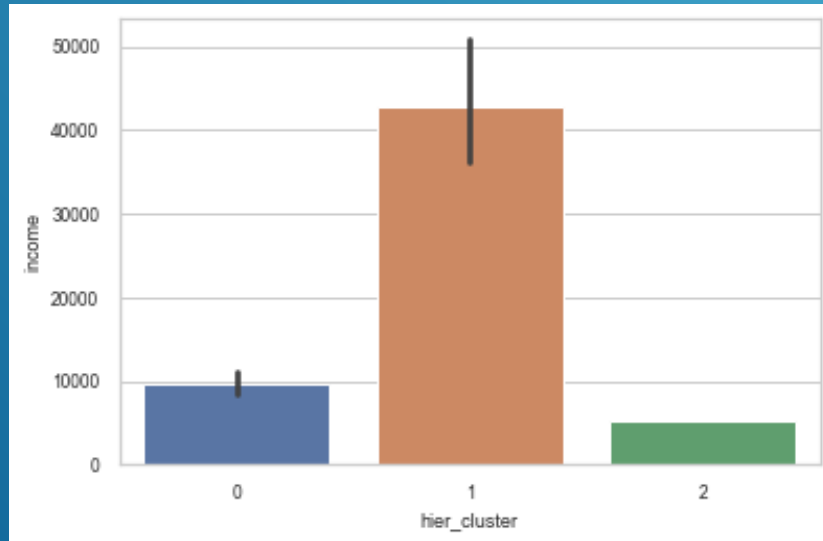
⬜ GDPP:

⬜ Child_mortality



AS WE CAN SEE HERE, COUNTRIES LIKE AFGHANISTAN, BAHRAIN, UK SEEM TO HAVE THE LOWEST GDPP AND HIGHER NUMBER OF CHILDREN DYING UNDER THE AGE OF 5 YEARS.
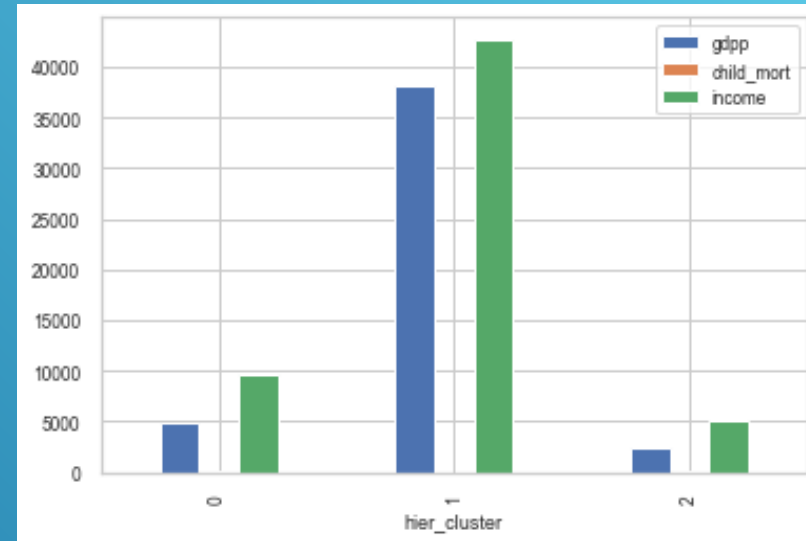
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# Findings of Hierarchical Clustering's (Contd.. )

☐ Income:

☐ Average GDPP, Child_mort, Income, Cluster Wise:
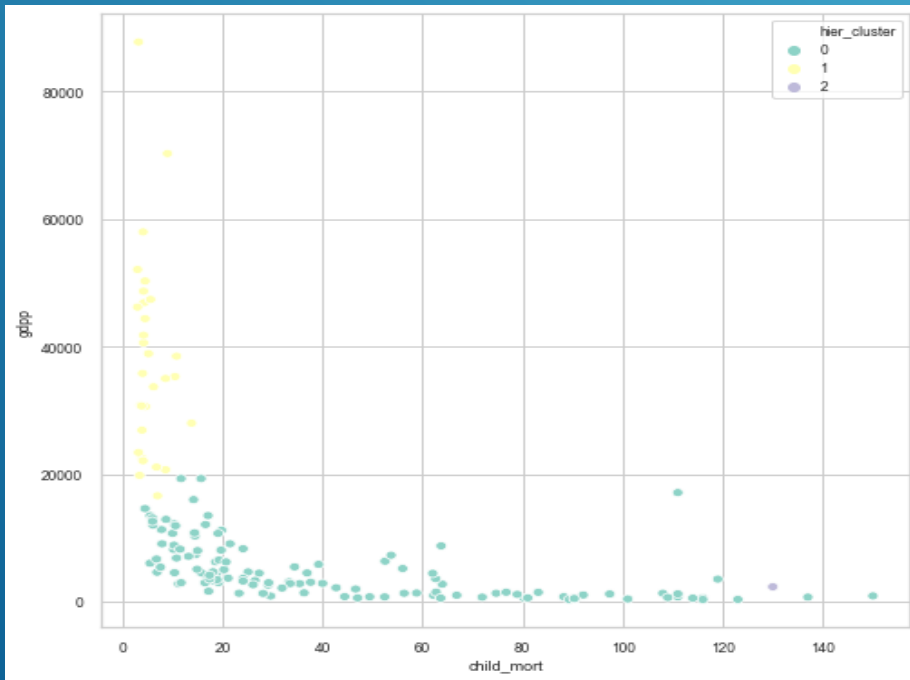


HERE WE CAN SEE COUNTRIES LIKE AFGHANISTAN, UK, BAHRAIN HAVE A LOWEST AVERAGE INCOME AND LOWEST HEALTH SPENDING'S
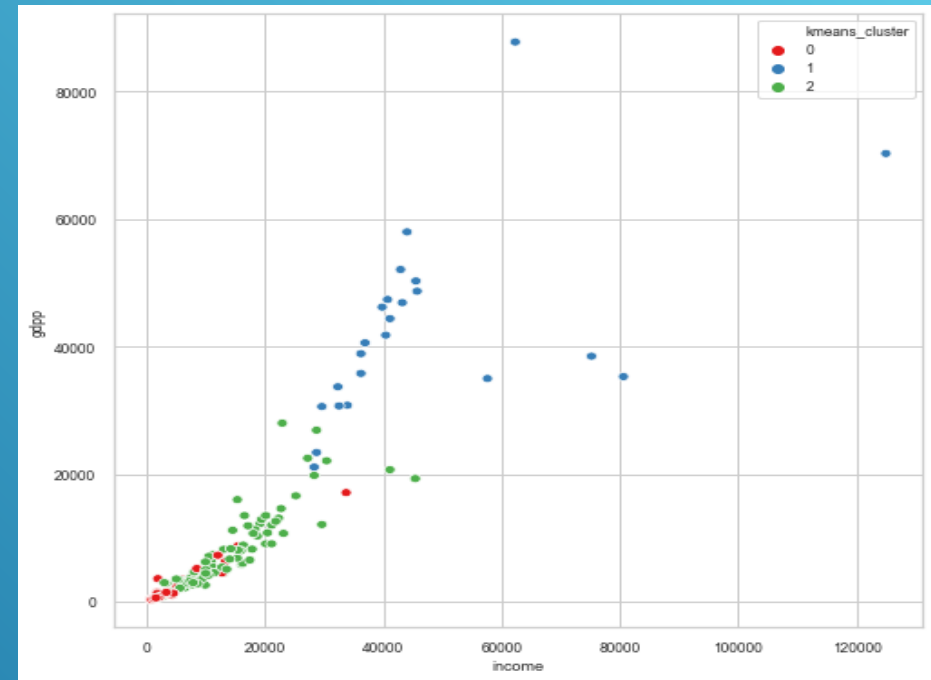
# Findings of Hierarchical Clustering's ( Contd.. )

- Scatter Plot Cluster Wise for Child_mort and GDPP

- Scatter Plot Cluster Wise for Child_mort and income





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#  Conclusions of Hierarchical Clustering

We can see the countries like Afghanistan, Bahrain, UK, India ( Cluster 0 ) Need help.
Here these countries have Higher number of children Dying under age of 5, Average 3 children per family, Lower Imports and Exports,
Countries like  Australia, Austria, Qatar, Seem to have lowest inflations, being an average GDP
country

# Conclusions of Hierarchical Clustering: Countries that require help Immediately

| Kenya | Chad | Malawi | Rwanda |
|-------|------|--------|--------|
| Nigeria | Guinea | Senegal | Kyrgyz Republic |
| Comoros | Solomon | Guinea-Bissau | Tajikistan |
| Guinea | Burkina Faso | Pakistan | Togo |
| Liberia | Solomon Islands | Afghanistan | |
| Cambodia | Ghana | Benin | |
| Cameroon | Uganda | Mauritania | |
| Congo Dem. Rep. | Mozambique | Gambia | |
| Nepal | Tanzania | Bangladesh | |
| Niger | Mali | Cote dIvoire | |

# THANK YOU!