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# Transhumance Hotspots Analysis

Physical Access Constraints and Food Insecurity  
in the Central African Republic



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## Summary

The Central African Republic (CAR) pastoralism adopted seasonal mobility which is transhumance in herding and shifting agriculture in farming. Transboundary pastoralism is practiced in CAR by Cameroonian, Chadian, Sudanese, and South Sudanese groups of herders. This activity is met with challenges ranging from cattle theft, farmer grazer problems, and armed groups activities which lead to incidents that are at times fatal.

Data from the Armed Conflict Location & Event Data Project (ACLED) publicly available, were analyzed to identify locations where a transhumance incidence occurred and subprefectures that are access constraints and food insecure due to the occurrence of transhumance incidences. Hotspot analysis provides a way to show the relationship between features and whether high or low values cluster spatially. In summary, the analysis groups subprefectures where similar High (Hot) or Low (Cold) numbers of incidents are found in a cluster. Hotspot analysis is therefore a basic form of incidences predictions, an analytical technique that can be used to help identify where management can target physical accessibility constraints, humanitarian aid, and transhumance conflict resolution mechanism resources.

From 2001 to 2021 (20 years) a total of 172 transhumant incidents with 739 fatalities were recorded. The hotspot analysis results reveal 5 subprefectures as transhumance hotspots with a 99% confidence level. They include Batangafo, Kabo, Kaga Bandoro, Markounda, and Bouca. The rest of the hotspots subprefectures are found in the northern parts of the country, especially the northwest, northeast, and southeast where hotspots vary between 90 to 95 percent confidence levels. The subprefectures in the south, southwest, east, and southeastern

part of the country range from no statistical significance to cold spots of 90, 95, and 99 percent confidence levels.

After an overlay of transhumance hotspots with IPC results of Sept 2021 to March 2022, ENSA 2021, cropland change 2021, and security roads classification February 2022, the results show 18 subprefectures in hotspots areas with challenging conditions ranging from high food insecurity to roads at high risks. For immediate and long-term food security initiatives, physical access, asset creation, and transhumance conflict resolution mechanisms considerations, the 18 subprefectures of Amada-Gaza, Abba, Bouar, Kouï, Bocaranga, Bossangoa, Bouca, Batangafo, Markounda, Kabo, Kaga-Bandoro, Dekoa, Bamingui, Bakala, Ippy, Bria, Ndélé, and Birao were considered priority 1 because they face many challenges to include food insecurity, and high-risk roads and are in transhumance hotspots. These 18 subprefectures have a total population of approx. 1,090,509.

Bozoum is a priority 2 subprefecture because it has medium challenges, and it has a population of approx. 67,146.

The rest of the 14 subprefectures of Baboua, Bossemptélé, Paoua, Ngaoundaye, Nana Bakassa, Nanga Boguila, Bogangolo, Mala, Mbres, Ouadda, and Ouanda Djalle are priority 3 because they face lesser challenges especially in the area of food security. All Priority 3 areas have a population of approx. 649,397. Therefore, approximately 1,807,052 people live in the programme priority areas.

Overall, these subprefectures have around 1,807,052 people living in transhumance hotspot areas.

The results from this analysis will be used to formulate data-driven programmes and policies

for early warning, emergency preparedness, and to orient food security, physical security, asset creation and livelihood initiatives, and transhumance conflict resolution mechanisms.

Available resources will therefore be used to target areas depending on the level of priority.

## Background

Traditionally, the Central African Republic (CAR) pastoralism and farming are food production systems that have adapted well to the climate variability by adopting seasonal mobility which is transhumance in herding and shifting agriculture in farming that complemented one another.<sup>1</sup> Pastoralism provided a means through which sedentary populations could increase their mobility to survive in the face of deteriorating climatic and other conditions.<sup>2</sup> In this process, they turn to face challenges that lead to security incidents.

With its favorable climate, scattered population, and huge swathes of pasture, the CAR provides ideal conditions for grazing cattle thus attractive to foreign pastoralists also. Instability and an increasing scarcity of resources in the Sahel and Lake Chad regions are driving many livestock herders to seek water and pasture for their herds in the CAR.<sup>3</sup> It is a known fact that many pastoralists come to CAR because their cattle are decimated by drought.<sup>4</sup>

The Central African Republic has been marred by civil war. "Since the crisis culminating in the 2013 coup d'état, the borderlands of CAR have turned into a hotspot of violent conflict involving

transhumant herders and farmers, armed groups and self-defense groups."<sup>5</sup> CAR security incidents have been characterized principally by armed conflict. The armed conflict is in the spotlight," having suffered the effects of armed violence from 2013, the CAR population is struggling to manage this further layer of conflict."<sup>6</sup> Behind the scenes lie pastoralist security incidences which is another kind of conflict that is caused by CAR and transboundary herder groups causing destruction, deaths, and rise of non-state armed groups (NSAG).

This paper is based on the analyses of data from the Armed Conflict Location & Event Data Project (ACLED) publicly available which was disaggregated based on pastoralist incidents. Transhumance in CAR is carried out by, Sudanese, Chadians, Cameroonian, and CAR herders' groups. Security incidents caused by transhumance ranged from battles (39), Explosions/Remote violence (1), Strategic developments (16), Violence against civilians (116). Events registered involved abductions, armed clashes, attacks, cattle theft, etc. These clashes have formed a conflict-within-the-conflict that further destabilizes the country, away from the international spotlight.<sup>7</sup>

1 Guillaume de Brier et al. (2020). "Promoting peaceful and safe seasonal migration in Northern Central African Republic" [https://pure.diis.dk/ws/files/4060092/2021\\_Concordis\\_Report.pdf](https://pure.diis.dk/ws/files/4060092/2021_Concordis_Report.pdf)

2 Pingback. (2016). "Hot Spot Analysis." <https://glenbambrick.com/2016/01/21/what-is-hotspot-analysis/>

3 SuperMap.(2022)."Hot spot Analysis" <https://help.supermap.com/iDesktop/en/tutorial/Analyst/SpatialStatisticalAnalysis/HotSpotAnalyst>

4 Ibid., Guillaume de Brier et al. (2020).

5 Ibid., Guillaume de Brier et al. (2020).

6 ICRC, 2021. "Climate change in Central African Republic. What threats?" (<https://www.icrc.org/en/document/climate-change-central-african-republic-what-threats>)

<sup>7</sup>International Crisis Group. (2014). "The Central African Republic hidden Conflict." <https://www.refworld.org/pdfid/54bcd0e64.pdf>

## OBJECTIVE

The study is aimed at analyzing data on the location where a security incidence occurred and identifying subprefectures that maybe access constraints due to the occurrence of transhumance incidences otherwise recognized as transhumance hotspots.

The aim is to:

- identify pastoralist security incident location in each subprefecture.
- Compute and map the number of fatalities in each subprefecture.
- Perform a transhumance hotspots analysis on the data.
- Analyze trends/patterns.
- Overlay transhumance hotspots areas with IPC results of Sept 2021 to March 2022, ENSA 2021, cropland change 2021, security roads classification February 2022, and prioritize programming areas.

## METHODOLOGY

ACLED data from 2001 to 2021, a period of 20 years was downloaded from the ACLED dashboard.<sup>8</sup> The data was further disaggregated into incidence that involved pastoralists. An attribute table was prepared by subprefecture, and the number of incidences and fatalities was computed.

Hotspot analyses require some clusters in the data. The entire dataset was tested for the presence of clustering with some prior analysis technique involving spatial autocorrelation with **Moran's I. technique**.<sup>9</sup> This test revealed positive z-score and non-significate p values which means there is spatial clustering. Summarily, the spatial distribution of high values and/or low values in the dataset is more spatially clustered than would be expected if underlying spatial processes were random. A transhumance route map (opensource data) was overlaid on the security incidents to confirm that incidents were not random occurrences.

With the concept model set to fixed distance and the measure distance set to Euclidean, a hotspot analysis was performed, and the output results obtained GiZscore, GiPvalue. These values were manually computed to generate Gi\_Conflnvl which are values that range from 3 to zero to -3 grouping subprefectures from hot to cold spots respectively to illustrate statistically significant positive scores or hot spots and negative scores or cold spots from intense clustering.<sup>10</sup> (See annex 1: Means of the various GI values linked to the hotspots)

The transhumance hotspots areas were overlay with IPC results of Sept 2021 to March 2022,<sup>11</sup> ENSA 2021,<sup>12</sup> cropland change 2021,<sup>13</sup> security roads classification February 2022,<sup>14</sup> and programming areas were prioritized based on how many negative indicators were found in each subprefecture.

<sup>8</sup> Raleigh, Clionadh, Andrew Linke, Håvard Hegre and Joakim Karlsen. (2010). "Introducing ACLED-Armed Conflict Location and Event Data." *Journal of Peace Research* 47(5) 651- 660." <https://acleddata.com/#/dashboard>

<sup>9</sup> Pingback. (2016). "Hot Spot Analysis." <https://glenbambrick.com/2016/01/21/what-is-hotspot-analysis/>

<sup>10</sup> SuperMap. (2022). "Hot spot Analysis"

<sup>11</sup> IPC., <https://www.ipcinfo.org/ipc-country-analysis/details-map/en/>

<sup>12</sup> WFP CO RCA : RCA ENSA 2021- Résultats Préliminaires

<sup>13</sup> WFP RBD RAM: Cropland dynamics and security incidence

<sup>14</sup> MINUSCA: Security Road Classification Map as of 16 February 2022

# 1: SPATIAL DISTRIBUTION OF TRANSHUMNCE INCIDENTS

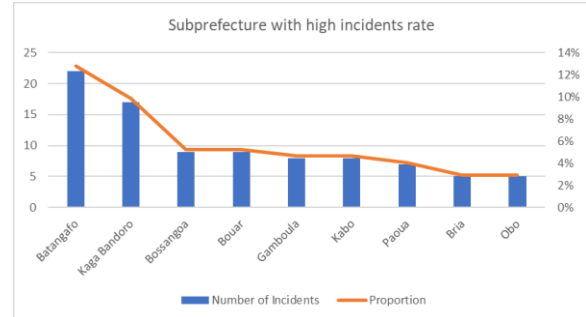
Between 2001 and 2021 a total of 172 incidents in CAR were related to Transhumance. 22 incidents were particularly related to foreign pastoralists (Transboundary). CAR pastoralists were involved in 150 incidents, Chadian in 13, Sudanese in 7, and Cameroonian in 2 incidents.

Out of 72 subprefectures, about 40 registered at least security incidents include Amada-Gaza, Baboua, Bambari, Bambouti, Bamingui, Bangassou, Bangui, Batangafo, Berberati, Birao, Boali, Bocarange, Bossangoa, Bossembele, Bouar, Bozoum, Bria, Damara, Gadzi, Gamboula, Grimari, Ippy, Kabo, Kaga Bandoro, Kembe, Kouango, Kouli, Markounda, Ndele, Njokou,

Ngaoundeye, Nola, Obo, Ouadda, Ounda Djalle, Paoua, Rafai, Sibut, Yaloke, Zangba, Zemio.

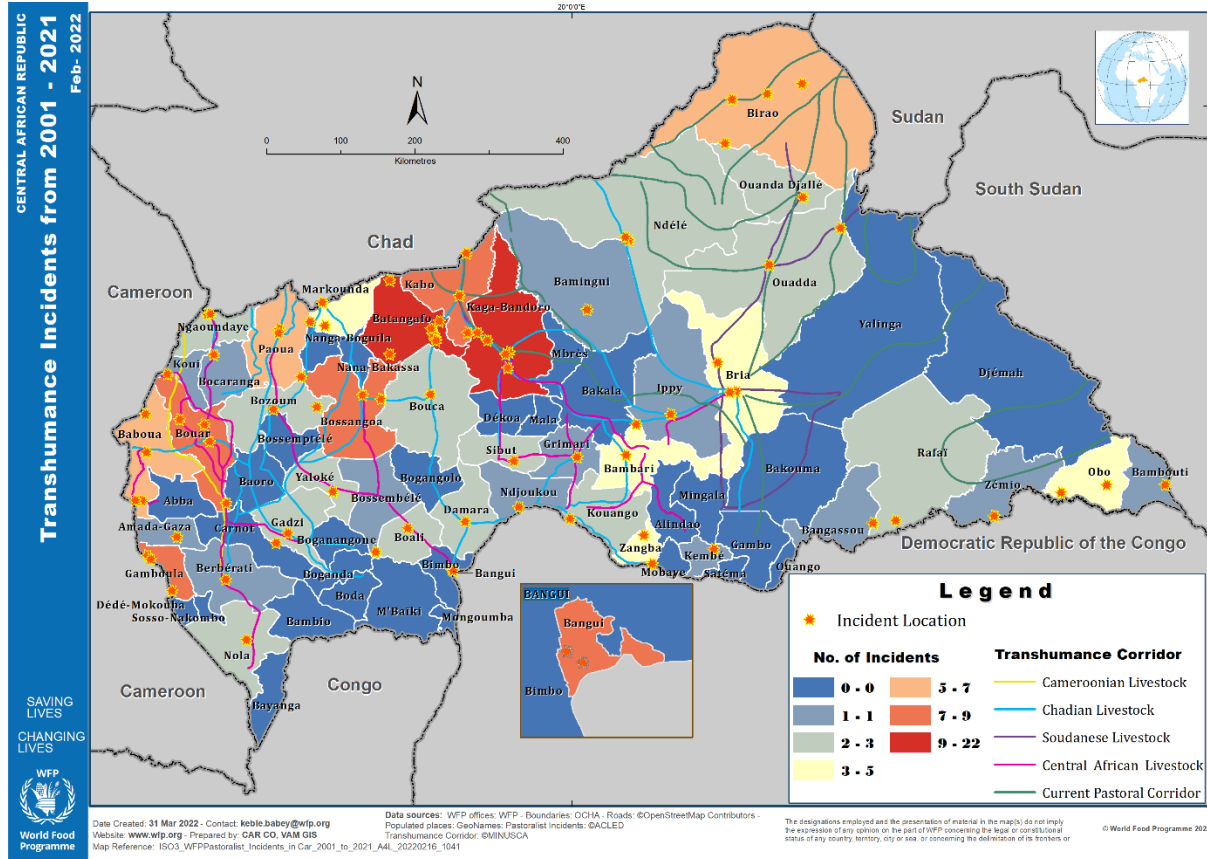
Some of the Subprefectures which recored high pastoralist incidences included Batangafo, Kaga Bandoro, Bossangoa, Bouar, Gamboula, Kabo, Bria, Poaua, Baboua, and Birao which recorded about 5 to 22 incidents.

Graph 1: Subprefectures with high number of incidences



Source : ACLED

MAP 1: SPATIAL DISTRIBUTION OF TRANSHUMNCE INCIDENTS



It should be noted that about 32 subprefectures didn't record pastoralist incidents despite the presence of transhumance corridors. They include Bimbo, Bayanga Bambio, Boda, M'Baiki, Mongoumbo, Boganda, Sosso-Nakombo, Dede-Mokouda, Carnot, Abba, Boganangone, Bogangolo, Baora, Bossempaté, Nanga Boguila, Nana Bakassa, Dekoa, Mala, Mbres, Bakala, Mingala, Alindao, Mobaye, Satéma, Gambo, Ouango, Bakouma, Yalinga, Djemah.

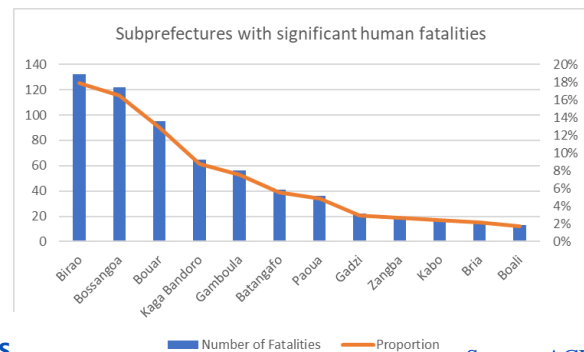
those involving Cameroonian pastoralists led to 10 fatalities.

Fatalities from pastoralist incidents was very high in the subprefectures of Birao which recorded a total of 132 deaths. Bossangoa, Bouar, Kaga Bandoro, Gamboula, Batangafo, Paoua, Gadzi, Zangba, Kabo, Bria and Boali recorded deaths ranging from ranging from 13 to 122, At the sametime these are where we have recorded some of the highest number of pastoralism incident.

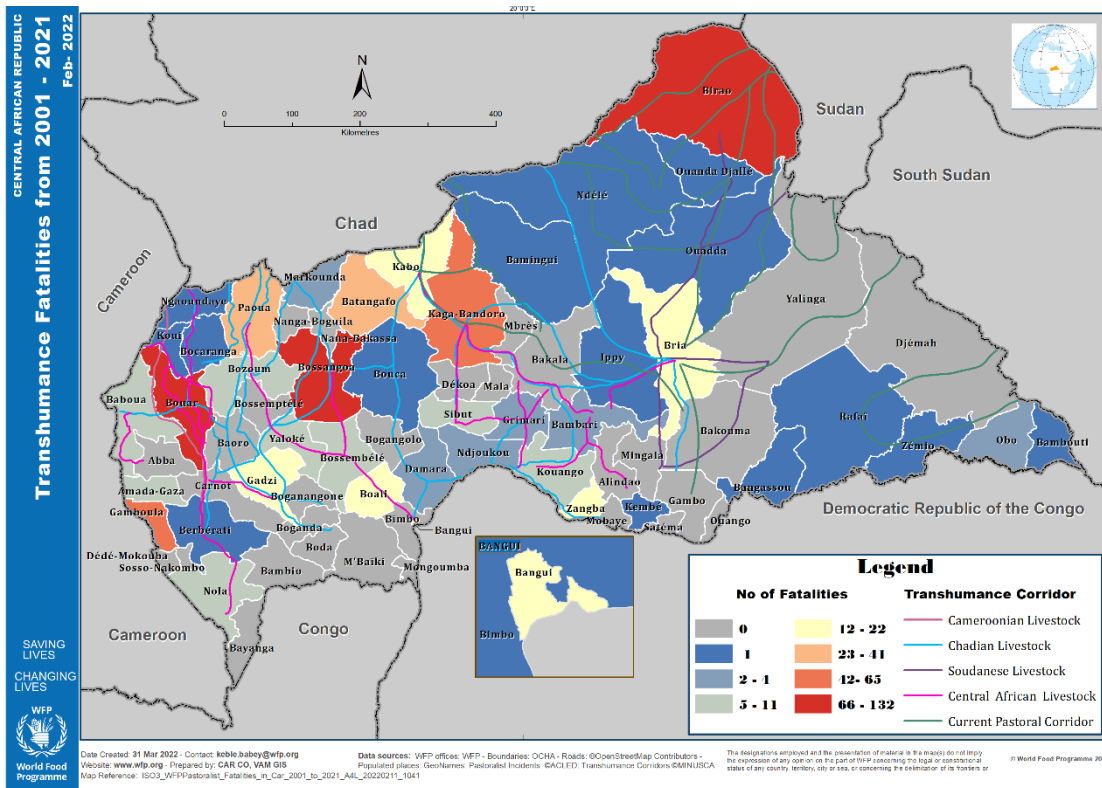
## 2: SPATIAL DISTRIBUTION OF TRANSHUMANCE FATALITIES

A total of 739 fatalities was recorded in the entire country during the period under study. Incidents involving pastoralists groups from CAR led to 524 fatalities, those involving Sudanese pastoralists led to 129 fatalities, those involving Chadian pastoralists led to 71 fatalities, and

Graph 2: Subprefectures with high human fatalities



MAP 2: SPATIAL DISTRIBUTION OF TRANSHUMANCE FATALITIES





About 17 other subprefectures that recorded mild fatalities include Bamingui, Ndele, Ouanda Djalle, Njoukou, Damara, Grimari, Obo, Markounda Bambari, Baboua, Sibut, Amada-Gaza, Yaloke and ranging from 1 to 12 fatalities.

12 Subprefectures recorded security incidents but with no fatalities. They include Kembé, Bambouti, Zemio, Berberati, Bangassou, Ippy, Bocaranga, Kouï, Ouadda, Rafai, Bouca, and Ngaoundaye.

### 3: TRANSHUMANCE HOTSPOTS ANALYSIS

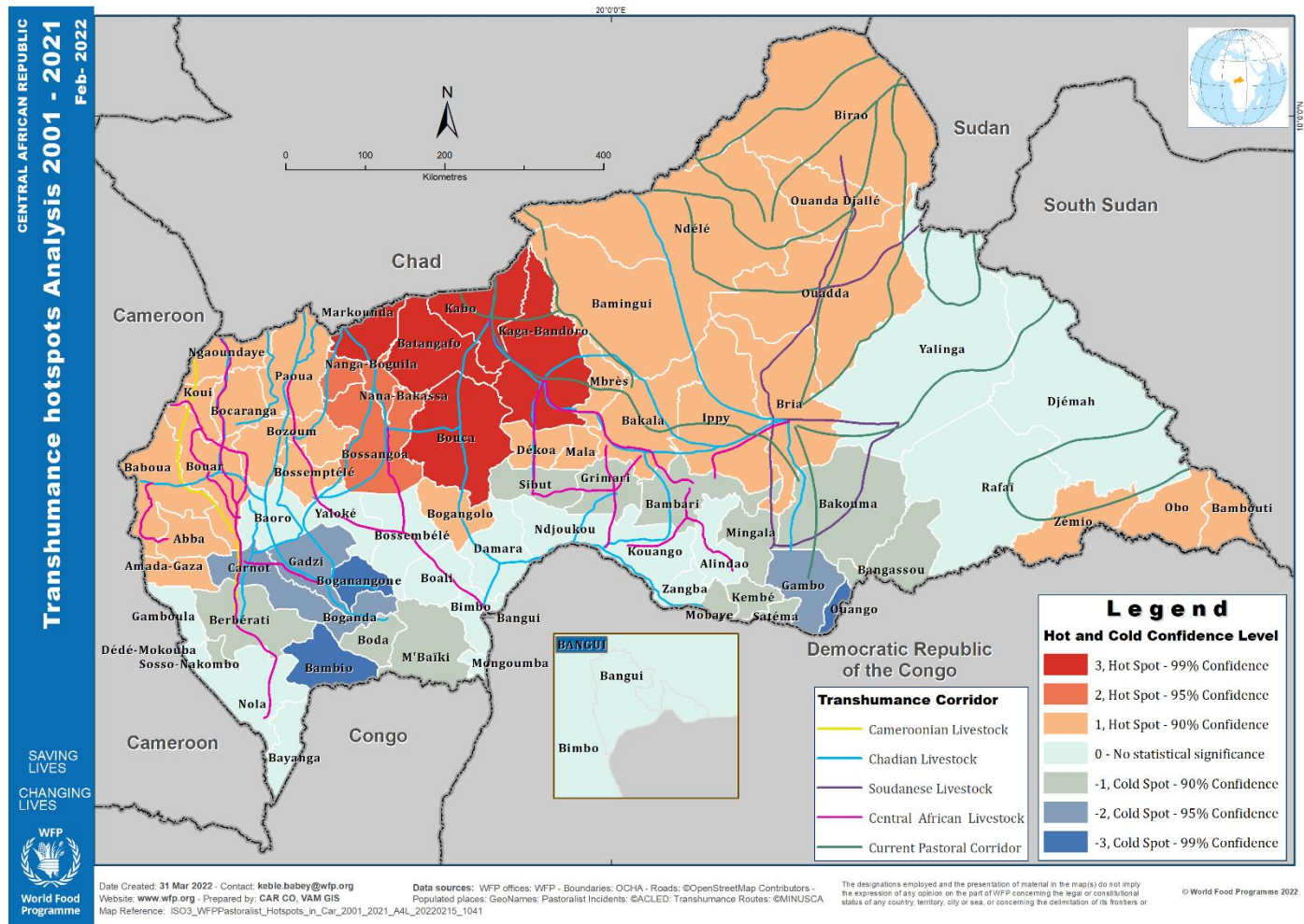
After running the hotspots analysis, a total of 33 subprefectures fall in the transhumance hotspot

areas. The results show 5 subprefectures as hotspots 99% confidence. This means that the tendency for pastoralist incidence to occur in these areas is very high, in other words, anytime a pastoralist incidence can be expected. They include Batangafo, Kabo, Kaga Bandoro, Markounda, and Bouca.

3 Subprefectures of 95% confidence include Bossangoa, Nana Bakassa, and Nanga Boguila.

About 24 subprefectures mostly in the Northwest, Northern, and Southeastern part of the country (Amda-Gaza, Abba, Baboua, Bouar, Bossemptele, Bozoum, Bocaranga, Kouï, Ngaoundaye, Paoua, Bongangolo, Dekoa, Mala, Bakala, Ippy, Bria, Mbres, Bamingui, Ndele,

MAP 3: TRANSHUMANCE HOTSPOTS IN THE CAR



Ouadda, Ouanda Djalle, and Birao) are hotspots at 90% confidence characterized by cattle movements from Cameroon, Chad, Sudan, and possibly South Sudan.

There are 18 Subprefectures with no statistical significance (Bayanga, Nola, Dede-Mokouba, Gamboula, Bimbo, Bangui, Boali, Baoro, Yaloke, Bossembele, Damara, Njoukou, Kouango, Zangba, Alindao, Rafai, Djemah, Yalinga).

About 12 subprefectures fall in the cold spots of 90% confidence (Sosso-Nakombo, Berberati, Boda, M'Baiki, Sibut, Grimari, Mingala, Kembe, Mobaye, Satema, Bangassou, Bakouma).

There are 4 Cold spots at 95 percent confidence including Carnot, Gadzi, Boganda, Gambo.

There are 3 cold spots at 99% confidence which are Boganangone, Bambio, Ouango (See annex 2: Transhumance hotspots analysis attribute table).

#### **4: SPATIAL ANALYSIS OF TRENDS AND PATTERNS OF TRANSHUMANCE HOT AND COLD SPOTS**

Hotspot analysis looks at the number of incidents in each subprefecture within the context of the number of incidents in the neighboring subprefecture. This means that a subprefecture that has a high number of incidents and is surrounded by subprefectures with a high number of incidents is a hot spot and a subprefecture that has a low number of incidents and is surrounded by subprefectures with a low number of incidents is a cold spot. Some interesting shifts were spotted in the transhumance map as follows.

Nana Bakassa, Nangha Boguila didn't experience pastoralist incidence but fall in the hotspot 95 percent confidence zone simply because they

are surrounded by subprefectures with high number of incidents. The probability for incidents in these two subprefectures is high and is confirmed by the movement of cattle from Chad down south.

Bossangoa recorded high number of incidents and fatalities but because it is surrounded by subprefectures with low values of incidence it turns to cluster towards a hotspot of 95% confidence instead of 99% confidence.

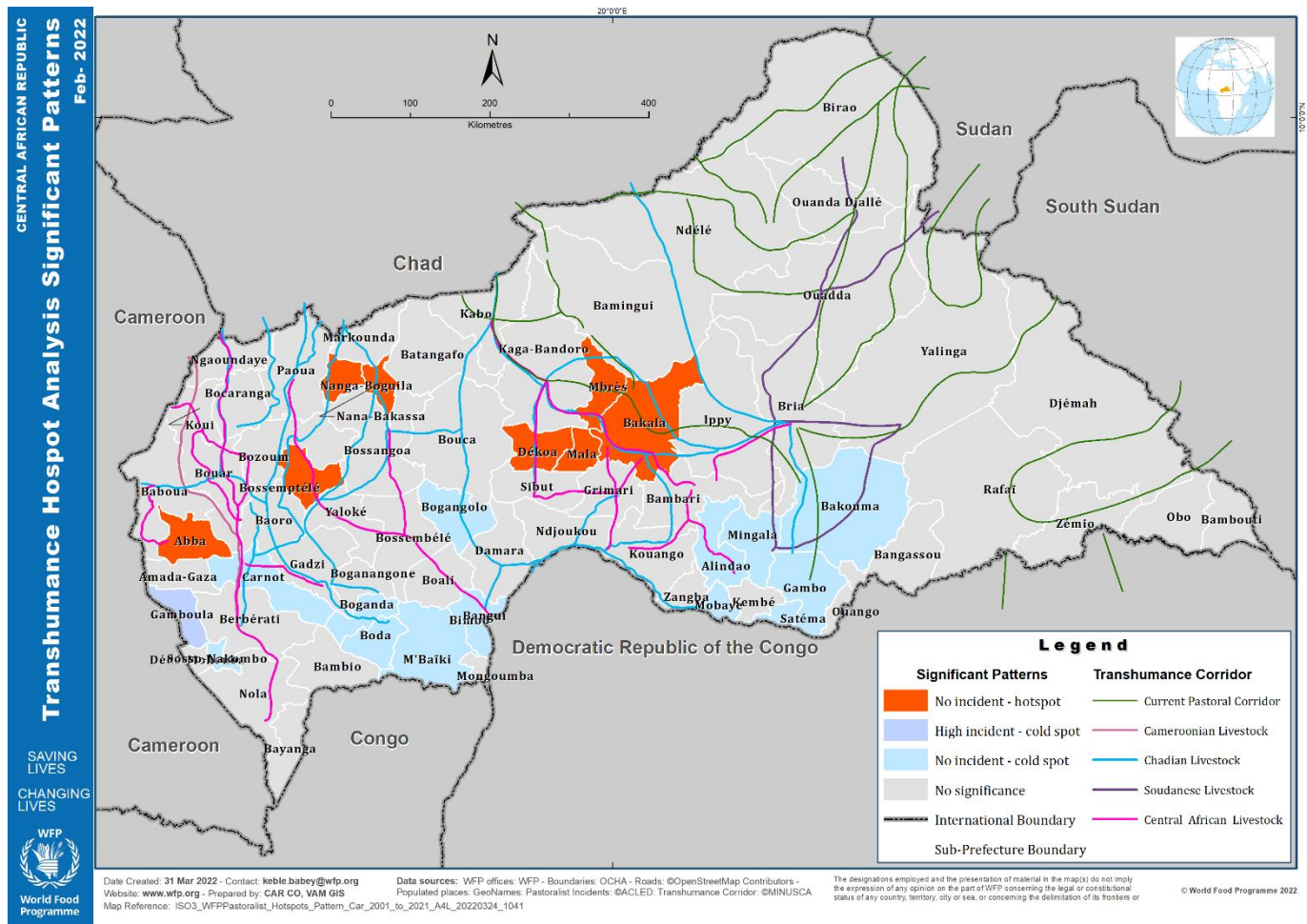
Gamboula and Kabo have registered the same number of incidents but fall within different statistical significance confidence levels because of the variation of incidents in neighboring subprefectures. Kabo falls within hotspot of 99% confidence because it is surrounded by subprefectures with high values. In other for Gamboula to be a significant hotspot, it must be surrounded by subprefectures with a high number of incidents. Gamboula is surrounded by Dede-Mokouba, Sosso-Nakombo which didn't register any incident and Berberati and Amadagaza which registered very few incidents.

Abba, Mbres, Dekoa, Mala, Bakala, Bossemptélé did not register incidents and turned to cluster towards hotspots of 90 percent confidence level because they are surrounded by subprefectures with high values. Except for Mala, these subprefectures are characterized by transhumance routes use by CAR, Chad, and Sudanese herder groups.

Subprefectures of Gamboula, Nola, Yaloké, Bossembélé, Boali, Damara, Njoukou, Kouango, Zangba and Rafai registered pastoralist incidences but are not statistically significant. Except for Gamboula, this is despite the presence of transhumance corridors use by herder groups from CAR and Chad.

Bokouma, Gambo, Satéma Mobaye, Bogangolo, M'baiki, Boda, Boganda, Carnot, Sosso-Nakombo, Bimbo, Mingala, Alindao didn't register incidents and turn to cluster towards 95 % cold spots though some of these subprefectures have transhumant corridors with cattle herder groups from Cameroon, Chad, and CAR.

**MAP 4: SPATIAL ANALYSIS OF TRENDS AND PATTERNS OF HOT AND COLD SPOTS**



#### **4: OVERLAY OF TRANSHUMANCE HOTSPOTS WITH IPC RESULTS OF SEPT 2021 TO MARCH 2022, ENSA 2021, CROPLAND CHANGE 2021, ROAD SECURITY CLASSIFICATION FEBRUARY 2022, AND PRIORITIZE PROGRAMMING AREAS.**

The IPC results of Sept 2021 to March 2022 show to an extent significant similarity with the transhumance hotspots map. While Ngaoundaye, Kouï, Bocaranga, Bozoum, and Obo are at IPC phase 4 and at hotspots of 90% confidence, all the other hotspots at 99% confidence fall under IPC phase 3 and include Batangafo, Kabo, Kaga Bandoro, Markounda, and Bouca. Hotspots of 95% that fall under IPC phase 3 include Bossangoa, Nana Bakassa, and Nangha Boguila. Other Subprefectures that are hotspots of 90% confidence and fall under IPC phase 3 are Amada-Gaza, Abba, Baboua, Bouar, Bossemptele, Paoua, Bogangolo, Dekoa, Mala, Bakala, Mbres, Ippy, Bria, Bamingui, Ouanda Djalle, Ouadda, BiraO.

Yalinga and Djema which show no statistical significance and never experience pastoralists incidence are IPC areas with no data to analyze.

ENSA 2021 results show that majority of subprefectures that scored high food insecure and high hunger index phase 3 and more (crisis, emergency, or famine) are found in transhumance hotspots areas. These subprefectures include BiraO, Amada-Gaza, Abba, Bouar, Kouï, Bocaranga, Bossangoa, Bouca, Batangafo, Kabo, Markounda, Kaga-Bandoro, Dekoa, Bakala, Ippy, Bamingui, Ndélé, Bria. Among these subprefectures with high scores of food insecurity and hunger index, Amada-Gaza, Kouï, Bocaranga, Bozoum, Bossangoa, Bouca, Batangafo, Kabo, Markounda, Kaga-Bandoro, Bamingui and Ndélé also experience poor food consumption patterns.

The cropland change analysis results of 2021 considered 23 subprefectures (Ndele, Mingali, Zangba, Ouadda, Bria, Yalinga, Bambouti, Zemio, Obo, Djema, Sibut, Rafai, Bouar, Ippy, Bakala, Bouca, Batangafo, Markounda, Paoua, Ngaoundaye, Nola, BiraO, Ouanda-Djalle). In all, Ndele BiraO, Ippy, Bria, Bouca, Batangafo, Kabo and Bouar which fall in the transhumant hotspots experienced significant decrease of cropland. Small areas of Bouar, Batangafo, Bouca, Ndele, Bria, BiraO experience cropland expansion while Ippy, Kabo, and Markounda only experienced significant diminution. Bambouti, Obo, Zemio, Ouadda, Ouadda-Djalla, Paoua and Ngaoundaye did not experience any changes and are found in transhumance hotspots, Bakala, experience an increase in cropland and is found in transhumance hotspots.

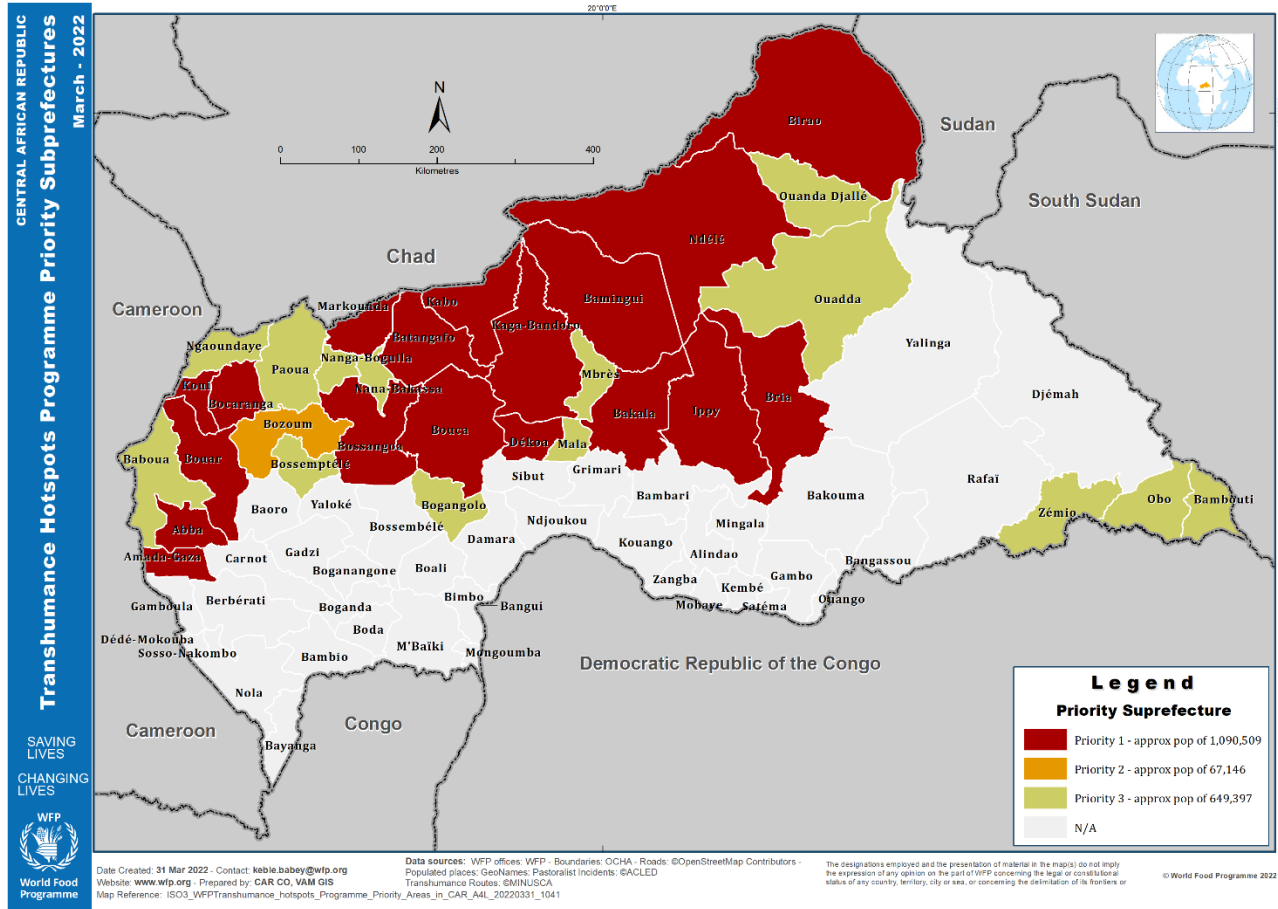
The security road classification map of February 2022 made available by MINUSCA show majority of the roads of high risk and potential risks falling in areas of transhumance hotspots. This means travelling in these roads are costly, requiring careful planning, special equipment, and at times military escort. The roads of medium low risks fall in areas of cold spots and in areas of no statistical significance, except for the road of medium to low risk south of Bouca and Bogangolo which fall in a 99% hotspot.

After overlaying transhumance hotspots with IPC results of Sept 2021 to March 2022, ENSA 2021, cropland change 2021, and security roads classification February 2022, the results show 18 subprefectures in hotspots areas with challenging conditions ranging from high food insecurity to roads at high risks. For immediate and long-term food security initiatives, physical access, asset creation, and transhumance conflict resolution mechanisms considerations, the 18 subprefectures of Amada-Gaza, Abba, Bouar, Kouï, Bocaranga, Bossangoa, Bouca,

Batangayo, Markounda, Kabo, Kaga-Bandoro, Dekoa, Bamingui, Bakala, Ippy, Bria, Ndélé, and Biraou are considered priority 1 subprefectures and have a population of approx. 1,090,509.<sup>15</sup> Bozoum is a priority 2 subprefecture with a population of approx. 67,146.

The rest of the 14 subprefectures of Baboua, Bossemptélé, Paoua, Ngaoundaye, Nana Bakassa, Nanga Boguila, Bogangolo, Mala, Mbres, Ouadda, and Ouanda Djalle are priority 3 and have a population of approx. 649,397 (See annex 3: Transhumance hotspots priority programming areas).

**MAP 5: TRANSHUMANCE HOTSPOTS PROGRAMMING AREAS**



<sup>15</sup> Population Source : OCHA 2016 projected population by commune

## Conclusion

The hotspot analysis results reveal 5 subprefectures as transhumance hotspots with a 99% confidence level. They include Batangafo, Kabo, Kaga Bandoro, Markounda, and Bouca. The rest of the hotspots subprefectures are found in the northern parts of the country especially the northwest, northeast, and southeast where hotspots vary between 90 to 95 percent confidence levels. The subprefectures in the south, southwest, east, and southeastern part of the country range from no statistical significance to cold spots of 90, 95, and 99 percent confidence levels.

After overlaying transhumance hotspots with IPC results of Sept 2021 to March 2022, ENSA 2021, cropland change 2021, and security roads classification February 2022, the results show 18 subprefectures in hotspots areas with challenging conditions ranging from high food insecurity to roads at high risks. For immediate and long-term food security initiatives, physical access, asset creation, and transhumance conflict resolution mechanisms considerations, the 18 subprefectures of Amada-Gaza, Abba,

Bouar, Kouï, Bocaranga, Bossangoa, Bouca, Batangafo, Markounda, Kabo, Kaga-Bandoro, Dekoa, Bamingui, Bakala, Ippy, Bria, Ndélé, and Birao were considered priority 1 because they face many challenges to include food insecurity, and high-risk roads and are in transhumance hotspots. These 18 subprefectures have a total population of approx. 1,090,509.

Bozoum is a priority 2 subprefecture because it has medium challenges, and it has a population of approx. 67,146.

The rest of the 14 subprefectures of Baboua, Bossemptélé, Paoua, Ngaoundaye, Nana Bakassa, Nanga Boguila, Bogangolo, Mala, Mbres, Ouadda, and Ouanda Djalle are priority 3 because they face lesser challenges especially in the area of food security. All Priority 3 areas have a population of approx. 649,397.

Overall, these subprefectures have approx. 1,807,052 people living in transhumance hotspot areas.

Nevertheless, in-depth analyzes are still necessary at the field level to better understand the recurrences of these incidents on the different corridors. Qualitative analysis would be needed with relevant stakeholders.

## ANNEXES

### ANNEX 1: MEANS OF THE VARIOUS GI VALUES LINKED TO THE HOTSPOTS

<b>Gi_Zscore(Standard Deviations)</b>	<b>Gi_Pvalue(probability)</b>	<b>Gi_ConfInvl value</b>	<b>Gi_ConfInvl</b>	<b>Analysis Result</b>
<-2.58	<0.01	-3	99%	Cold spot which has statistical significance with a 99 percent confidence level.
<-1.96	<0.05	-2	95%	Cold spot which has statistical significance with a 95 percent confidence level.
<-1.65	<0.1	-1	90%	Cold spot which has statistical significance with a 90 percent confidence level.
smaller and closer to 0	--	0	--	No statistical significance.
>1.65	<0.1	1	90%	Hot spot which has statistical significance with 90 percent confidence level.
>1.96	<0.05	2	95%	Hot spot which has statistical significance with 95 percent confidence level.
>2.58	<0.01	3	99%	Hot spot which has statistical significance with 99 percent confidence level.

## ANNEX 2: TRANSHUMANCE HOTSPOTS ANALYSIS ATTRIBUTE TABLE

OBJECTID	Subprefecture	N_Inciden	GiZScore	GIPValue	Gi_Confin	Out_pu	Legend
1	Bamingui	1	1.085945	0.277504	1.363449	1	Hot Spot - 90% Confidence
2	Ndélé	3	-0.14428	0.885279	0.740999	1	Hot Spot - 90% Confidence
3	Bangui	8	-0.6954	0.486804	-0.208596	0	No statistical significance
4	Alindao	0	-0.875683	0.381202	-0.494481	0	No statistical significance
5	Kembé	1	-1.047998	0.29464	-0.753358	-1	Cold Spot - 90% Confidence
6	Mingala	0	-1.209802	0.226355	-0.983447	-1	Cold Spot - 90% Confidence
7	Zangba	4	-0.875683	0.381202	-0.494481	0	No statistical significance
8	Bambouti	1	0.226726	0.820637	1.047363	1	Hot Spot - 90% Confidence
9	Djémah	0	-0.700789	0.483435	-0.217354	0	No statistical significance
10	Obo	5	-0.025426	0.979715	0.954289	1	Hot Spot - 90% Confidence
11	Zémio	1	-0.207022	0.835993	0.628971	1	Hot Spot - 90% Confidence
12	Bria	5	-0.207022	0.835993	0.628971	1	Hot Spot - 90% Confidence
13	Ouada	2	-0.073936	0.941061	0.867125	1	Hot Spot - 90% Confidence
14	Yalinga	0	-0.515286	0.606353	0.091067	0	No statistical significance
15	Dékoa	0	-0.023537	0.981222	0.957685	1	Hot Spot - 90% Confidence
16	Mala	0	0.274242	0.783898	1.05814	1	Hot Spot - 90% Confidence
17	Njoukou	1	-0.519102	0.60369	0.084588	0	No statistical significance
18	Sibut	2	-1.152215	0.249233	-0.902982	-1	Cold Spot - 90% Confidence
19	Boda	0	-1.199721	0.230248	-0.969473	-1	Cold Spot - 90% Confidence
20	Boganangone	0	-1.80583	0.070945	-1.734885	-3	Cold Spot - 99% Confidence
21	Boganda	0	-1.526917	0.126782	-1.400135	-2	Cold Spot - 95% Confidence
22	M'Baïki	0	-0.955602	0.339273	-0.616329	-1	Cold Spot - 90% Confidence
23	Mongoumba	0	-0.280113	0.779391	0.499278	0	No statistical significance
24	Amada-Gaza	1	0.097944	0.921977	1.019921	1	Hot Spot - 90% Confidence
25	Berbérati	1	-1.272456	0.203211	-1.069245	-1	Cold Spot - 90% Confidence
26	Carnot	0	-1.482825	0.138121	-1.344704	-2	Cold Spot - 95% Confidence
27	Dédé-Mokouba	0	-0.592789	0.553322	-0.039467	0	No statistical significance
28	Gadzi	2	-1.526917	0.126782	-1.400135	-2	Cold Spot - 95% Confidence
29	Gamboula	8	-0.592789	0.553322	-0.039467	0	No statistical significance
30	Sosso-Nakombo	0	-0.959849	0.337131	-0.622718	-1	Cold Spot - 90% Confidence
31	Bakouma	0	-0.919149	0.358017	-0.561132	-1	Cold Spot - 90% Confidence
32	Bangassou	1	-1.07262	0.283442	-0.789178	-1	Cold Spot - 90% Confidence
33	Gambo	0	-1.576894	0.11482	-1.462074	-2	Cold Spot - 95% Confidence
34	Ouangou	0	-1.659809	0.096953	-1.562856	-3	Cold Spot - 99% Confidence
35	Rafaï	2	-0.483095	0.629029	0.145934	0	No statistical significance
36	Kaga-Bandoro	17	2.62705	0.008613	2.635663	3	Hot Spot - 99% Confidence
37	Abba	0	0.097944	0.921977	1.019921	1	Hot Spot - 90% Confidence
38	Baboua	6	0.131481	0.895394	1.026875	1	Hot Spot - 90% Confidence
39	Baoro	0	-0.400669	0.688664	0.287995	0	No statistical significance
40	Bouar	9	-0.078355	0.937546	0.859191	1	Hot Spot - 90% Confidence
41	Mbrès	0	0.183226	0.854621	1.037847	1	Hot Spot - 90% Confidence
42	Bimbo	0	-0.870869	0.383826	-0.487043	0	No statistical significance
43	Boali	3	-0.872524	0.382922	-0.489602	0	No statistical significance
44	Bogangolo	0	0.07485	0.940334	1.015184	1	Hot Spot - 90% Confidence
45	Bosse mbélé	1	-0.36281	0.716747	0.353937	0	No statistical significance
46	Damara	3	-0.701403	0.483052	-0.218351	0	No statistical significance
47	Yaloké	3	-0.627127	0.530576	-0.096551	0	No statistical significance
48	Bakala	0	0.230443	0.817748	1.048191	1	Hot Spot - 90% Confidence
49	Bambari	4	-1.040336	0.298184	-0.742152	-1	Cold Spot - 90% Confidence
50	Grimari	1	-0.96786	0.333114	-0.634746	-1	Cold Spot - 90% Confidence
51	Ippy	1	0.059149	0.952833	1.011982	1	Hot Spot - 90% Confidence
52	Kouango	3	-0.691329	0.489359	-0.20197	0	No statistical significance
53	Batangafo	22	4.257303	0.000021	4.257324	3	Hot Spot - 99% Confidence
54	Bossangoa	9	1.908647	0.056308	1.964955	2	Hot Spot - 95% Confidence
55	Bouca	2	2.566126	0.010284	2.57641	3	Hot Spot - 99% Confidence
56	Kabo	8	5.648737	0	5.648737	3	Hot Spot - 99% Confidence
57	Nana-Bakassa	0	2.442696	0.014578	2.457274	2	Hot Spot - 95% Confidence
58	Nanga-Boguilla	0	2.213528	0.026861	2.240389	2	Hot Spot - 95% Confidence
59	Bocaranga	1	0.450541	0.65232	1.102861	1	Hot Spot - 90% Confidence
60	Bosse mptélé	0	0.119818	0.904627	1.024445	1	Hot Spot - 90% Confidence
61	Bozoum	3	0.471117	0.637557	1.108674	1	Hot Spot - 90% Confidence
62	Koui	1	1.263366	0.206458	1.469824	1	Hot Spot - 90% Confidence
63	Ngaoundaye	2	0.645974	0.518296	1.16427	1	Hot Spot - 90% Confidence
64	Paoua	7	0.362392	0.717059	1.079451	1	Hot Spot - 90% Confidence
65	Bambio	0	-1.718201	0.08576	-1.632441	-3	Cold Spot - 99% Confidence
66	Bayanga	0	-0.872449	0.382963	-0.489486	0	No statistical significance
67	Nola	3	-0.689791	0.490326	-0.199465	0	No statistical significance
68	Birao	7	0.783235	0.433489	1.216724	1	Hot Spot - 90% Confidence
69	Ouanda Djallé	2	0.584799	0.558683	1.143482	1	Hot Spot - 90% Confidence
70	Markounda	5	3.527134	0.00042	3.527554	3	Hot Spot - 99% Confidence
71	Satéma	0	-1.368804	0.171061	-1.197743	-1	Cold Spot - 90% Confidence
72	Mobaye	0	-1.047998	0.29464	-0.753358	-1	Cold Spot - 90% Confidence



### ANNEX 3: TRANSHUMANCE HOTSPTS PROGRAMME PRIORITY AREAS

Integrated Transhumance Hotspots Programming Areas												
ObjectID	Subprefecture	Hotspot	IPC_Phase	ENSA 2021			Cropland_change	Road	Ppty_Areas	P1_Pop	P2_Pop	P3_Pop
				Food_Insec_ure	Hunger_in_dice	MauviseC_A						
1	Birao	Yes	IPC 3	High	High		Reduction	High risk	Priority 1	61,919		
2	Amada-Gaza	Yes	IPC 3	High	High	High		High risk	Priority 1	22,010		
3	Abba	Yes	IPC 3	High	High	High		High risk	Priority 1	28,555		
4	Bouar	Yes	IPC 3	High	High		Reduction	High risk	Priority 1	157,450		
5	Baboua	Yes	IPC 3					High risk	Priority 3			67,513
6	Koui	Yes	IPC 4	High	High	High		High risk	Priority 1	37,952		
7	Bocaranga	Yes	IPC 4	High	High	High	Reduction	High risk	Priority 1	103,900		
8	Bozoum	Yes	IPC 3			High		High risk	Priority 2		67,146	
9	Bossemptélé	Yes	IPC 3					High risk	Priority 3			23,095
10	Paoua	Yes	IPC 3					High risk	Priority 3			203,258
11	Zémio	Yes	IPC 3					High risk	Priority 3			28,351
12	Ngaoundaye	Yes	IPC 4					High risk	Priority 3			117,046
13	Bossangoa	Yes	IPC 3	High	High	High		High risk	Priority 1	128,182		
14	Nana-Bakassa	Yes	IPC 3					High risk	Priority 3			59,257
15	Nanga-Boguila	Yes	IPC 3					High risk	Priority 3			28,409
16	Bogangolo	Yes	IPC 3					Low risk	Priority 3			9,428
17	Bouca	Yes	IPC 3	High	High	High	Reduction	High risk	Priority 1	70,275		
18	Batangafu	Yes	IPC 3	High	High	High	Reduction	High risk	Priority 1	66,992		
19	Obo	Yes	IPC 4					High risk	Priority 3			42,180
20	Kabo	Yes	IPC 3	High	High	High	Reduction	High risk	Priority 1	51,631		
21	Markounda	Yes	IPC 3	High	High	High	Reduction	High risk	Priority 1	23,313		
22	Kaga-Bandoro	Yes	IPC 3	High	High	High		High risk	Priority 1	123,849		
23	Dékoa	Yes	IPC 3	High	High			High risk	Priority 1	45,997		
24	Mala	Yes	IPC 3					High risk	Priority 3			18,188
25	Mbrés	Yes	IPC 3					High risk	Priority 3			27,118
26	Bakala	Yes	IPC 3	High	High			High risk	Priority 1	10,483		
27	Ippy	Yes	IPC 4	High	High		Reduction	High risk	Priority 1	54,171		
28	Bamingui	Yes	IPC 3	High	High	High		High risk	Priority 1	8,580		
29	Bambouti	Yes	IPC 3					High risk	Priority 3			911
30	Ouadda	Yes	IPC 3					High risk	Priority 3			19,604
31	Ndélé	Yes	IPC 3	High	High	High	Reduction	High risk	Priority 1	5,459		
32	Ouanda Djallé	Yes	IPC 3					High risk	Priority 3			5,039
33	Bria	Yes	IPC 3	High	High		Reduction	High risk	Priority 1	89,791		
<b>Total Population by Priority Areas</b>										<b>1,090,509</b>	<b>67,146</b>	<b>649,397</b>
<b>Population Source: OCHA PopEstimate: 2016</b>												

## Acronyms

<b>ACLED</b>	Armed Conflict & Event Data Project
<b>ENSA</b>	Evaluation Nationale de la Sécurité Alimentaire
<b>IPC</b>	Integrated Food Security Phase Classification

## Photo Credit

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## **World Food Programme**

Bangui Country Office

Rue de l'Université BP 1048,

Bangui, RCA

**wfp.org**

## **For more information, please contact:**

Keble BABEY - GIS OFFICER  
[keble.babey@wfp.org](mailto:keble.babey@wfp.org)

Wilfred Nkwambi - Senior Programme Policy Officer  
[wilfred.nkwambi@wfp.org](mailto:wilfred.nkwambi@wfp.org)

Aliou Badara SAMAKE - RAM OFFICER  
[alioubadara.samake@wfp.org](mailto:alioubadara.samake@wfp.org)