'Africa Connect

Sant'Anna School of Advanced Studies – Pisa

Ministero degli Affari Esteri e della Cooperazione Internazionale

ACRES-WA

Project ACRES-WA

Advancing Climate Change Resilience and Enhancing Security in West Africa

POLICY BRIEF

Valentina D'Amico, Sara de Simone, Luca Raineri, Stefania Sellitti, Mariachiara Boldrini

March 2025

March 2025
Sant'Anna School of Advanced Studies Cover
photo: AI-generated

The publication is part of the research-action **ACRES WA project** "**Advancing Climate Change Resilience and Enhancing Security in West Africa**" sponsored by the Italian Ministry of Foreign Affairs and International Cooperation. The ACRES-WA project was implemented between December 2023 and March 2025 by a team of researchers of the Sant'Anna School of Advanced Studies of Pisa and partner institutions under the direction of Professors **Francesco Strazzari** and **Enrico Pè**.

1. Navigating climate challenges, resource competition and conflict: Insights from Côte d'Ivoire

The impact of climate change on Côte d'Ivoire has been well documented, and, based on IPCC analysis, precipitations are forecast to become even more irregular and temperatures to rise. The increase of temperatures has almost doubled in the last ten years,[1] while the decrease in rainfall has been identified as one of the most visible effects of climate change in the country since the 1970s.[2] The population's capacity to adapt is limited by the weakness of early warning systems, which focus predominantly on the economic capital, Abidjan, leaving the rest of the country with inadequate tools to manage extreme weather events.[3]

At the same time, as in the rest of the Gulf of Guinea countries, agriculture relies heavily on rainfed systems. This makes productive systems highly vulnerable to climatic stresses, jeopardising food security and potentially fuelling social unrest and political instability. A study conducted by the Consultative Group on International Agricultural Research revealed for example that, in Côte d'Ivoire, crops such as maize, rice, cassava, as well as tree crops such as cocoa, mangoes and cashew witnessed unstable crop yields in the last decade compared to the previous one.[4]

Enhancing access to productive inputs such as land and water is thus even more important for farmers who wish to keep a decent level of productivity. In a region characterised by the co-existence of different communities practicing subsistence and commercial agriculture, as well as nomadic and semi-nomadic pastoral activities, this might worsen competition for the access to natural resources. Existing evidence suggests that Northern Côte d'Ivoire is particularly vulnerable to conflicts due to climate-related resource scarcity,[5] and that it has already experienced major clashes between semi-nomadic pastoralists and sedentary farmers in the past decade.[6] At the same time, the interplay of climatic factors with the complexity of the country's historical vicissitudes and the politicisation of many existing social cleavages requires an accurate analysis that avoids simplistic assumptions.

2. ACRES-WA in a nutshell

ACRES-WA combines climate, agriculture and political sciences to enhance the capacity of Northern Côte d'Ivoire's communities to cope with climatic stressors, contribute to food security and tackle the drivers of conflicts and violent extremism. The overall ambition of the

[1] FAOSTAT. (2022). Retrieved from https://www.fao.org/faostat/en/#data/OA/visualize

[2] Kouakou, K. F. J., & Kouassi, K. G. (2022). *Changement climatique en Côte d'Ivoire : impact sur les systèmes culturaux et résilience paysanne (1970 à la fin des années 1990).* Editions Francophones Universitaires d'Afrique.

[3] Reggiani, P., Dossou Togbe, A., & I. Ouèbounga Beneagabou (2022). *VFDM project: Integrating flood and drought management and early warning for the climate change adaptation in the Volta Basin.* Project implemented by World Meteorological Organization. Mid-term evaluation report. VFDM_Mid-Term_Evaluation_Report_1Sep20222_3356_11690278654495.pdf.

[4] Ouedraogo, A., Ouedraogo, M., Jiménez Daniel, D., Kagabo, D., Singh, M., & Laderach, P. (2023). *Mapping climate and agronomic digital advisory services landscape under the Transforming Agrifood Systems in West and Central Africa Initiative (TAFS-WCA): A case of Cote d'Ivoire.* 49p. CGIAR Research Initiative on Transforming Agri-Food Systems in West and Central Africa (TAFS-WCA), Report December 2023.

[5] Ministère de la Salubrité, de l'Environnement et du Développement Durable (MINSEDD). (2017). *Rapport de la Troisième Communication Nationale (TCN) de la Côte d'Ivoire dans le cadre de la Convention-Cadre des Nations Unies sur les Changements Climatiques (CCNUCC).*

[6] Speight, J. (2017). Bouna, une « instabilité permanente » ? Foncier, autorité et violence post-conflit en Côte d'Ivoire dans la longue durée. *Afrique contemporaine, 263-264*(3-4), 197–215.

project is to support the development of climate services, including forecasting tools, that are relevant for local farmers and pastoralist communities to enhance food security and ensure the adaptation of agricultural systems to a changing climate. This will contribute to defusing potential conflicts between farmers and pastoralist communities, which the deregulation of rainy and dry seasons and the modification of traditional transhumance routes and timing might exacerbate. The growing vulnerability and polarisation of identities that ensues are among the most important drivers of mobilisation by violent extremist groups in the region.

3. Methodology

The research was carried out by an interdisciplinary research team combining agrometeorology, agro-economics, political science and area studies. Focusing on Northern Côte d'Ivoire as a transitional ecoregion of interest, the team identified two case-study areas:

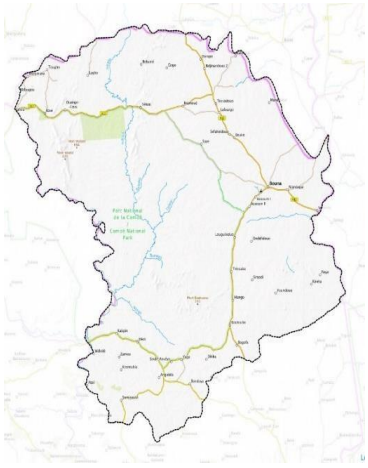
Bouna Municipality, Bounkani region

Features:

Transition between ecosystem zones (arboreal and arid savannah) impacted by climate change enhanced frictions between farmers and herders.

Recent attacks by violent extremist groups at the border with Burkina Faso (2020-22)

Recent history of violent farmer-herder conflicts (major clashes in 2016) → Risk of social polarisation as a breeding ground for violent extremism.



Bondoukou Municipality, Gontougo region

Features:

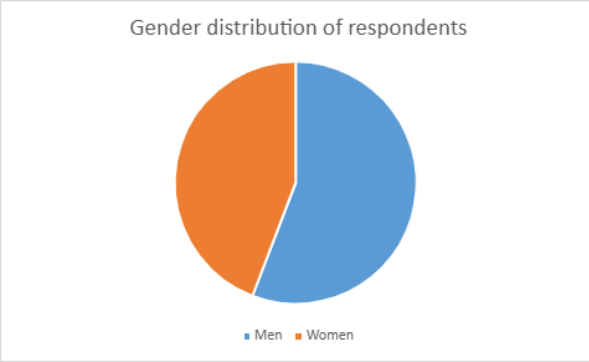
Savannah transitional agroecological zone, characterised by a mix of forest and savannah landscapes.

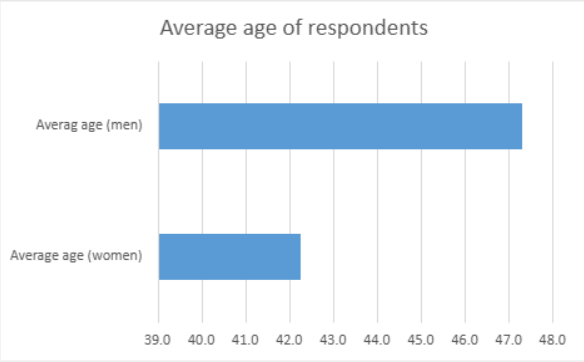
The region is known for its diverse agricultural output, including crops such as cocoa, coffee, cotton, maize, yams, and sorghum.

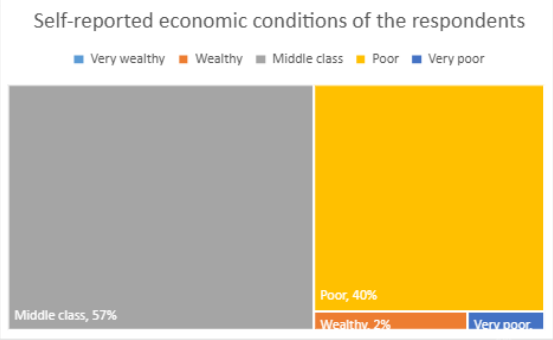
Despite the diversified agricultural production, challenges such as limited infrastructures and services and market access contribute to food insecurity in the region.

The research relied on the analysis of existing academic and grey literature, as well as on two field visits (May 2024 in Abidjan; October 2024 in Bouna and Bondoukou) during which a significant number of primary sources were consulted with a view to collecting qualitative data through interviews and focus group discussions (FGDs).

Interviews with key stakeholders in Abidjan (government institutions; donors; development & humanitarian agencies)	18	
Interviews with key stakeholders in Bouna (local government authorities, traditional authorities, religious authorities, civil society)	18	
Interviews with key stakeholders in Bondoukou (local government authorities, traditional authorities, civil society)	5	
Focus group discussions in Bouna	2	15 Farmers 15 Herders
Focus group discussions in Bondoukou	6	20 Cash crop Farmers (10 men, 10 women) 20 Farmers (10 men, 10 women) 20 Herders (10 men, 10 women)



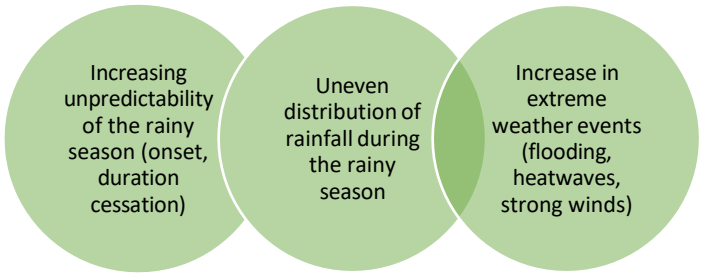




4. Unveiling critical challenges: community perception about climate change

4.1 Adaptation capacity to climate change

Local communities in Northern Côte d'Ivoire are increasingly affected by climate change. Perceived effects of climate change on farmers and herders/pastors' productive activities in the Bouna and Bondoukou regions include:[7]



Overall, local communities exhibit a **limited capacity for adaptation**, primarily due to inadequate infrastructure, access to inputs, essential services, and capacity-building initiatives. Existing adaptation strategies include the following:

- Market-based solutions (buying water),
- Switch to drought-tolerant crops (such as cassava or yam),
- Prayers,
- Diversifying economic activities (trade, artisanal gold mining, pastoralists starting cropping; farmers investing in livestock),
- Relocation/migration/transhumance.

As for farmers, both women and men tend to seek assistance from family members and children, but men more frequently do so with labourers and also rely on building networks of community associations. Compared to their male counterparts, female farmers are also more likely to diversify economic activities (such as trade and farmers starting new crops) and transition from cash crops to food crops.

As for herders, the diversification of activities to generate additional income differs between men and women: for men, it involves trade, artisanal mining, studying to obtain a diploma, but also informal and sometimes illegal activities; while for women it involves transitioning to agriculture and food trade (manioc, rice, maize), fishing, and cattle trade.

4.2 Climate services

The mapping of existing climate services through literature review and interviews revealed a fragmented landscape of services available to farmers and herders, both in terms of different providers (Public -Sodexam-, but mostly Private, focusing on cash crops value-chain), the types of services offered (weather forecasts, agro-meteorological bulletins, seasonal climate outlooks), and their geographical dissemination. **In the study sites, access to weather information remains limited among producers, with a strong reliance on traditional knowledge to predict the on-set of the rainy season** (Tab. 1). Herders—both men and women—have the least access to meteorological data and rely almost entirely on environmental signals. Among farmers, women report slightly more exposure to weather forecasts than men but often access this information indirectly through family members due to limited direct access or significantly low literacy levels, which are particularly pronounced

[7] Other challenges reported by the research participants such as the reduction of agricultural productivity are less clearly attributable to climate change and might also be linked to other causes such as the unregulated use of pesticides.

among women. The main sources of weather information include television, WhatsApp groups, and paid mobile services. Nevertheless, it is important to acknowledge that, in general, these communities do not distinguish between weather forecasts and climate services specifically designed for agriculture and pastoralism.

These indicators guide key agricultural and livestock activities. Farmers use them to determine the timing of land clearing, preparation, and sowing, while herders rely on them to plan livestock movements, ensuring animals have access to food and water, and are protected from harsh weather conditions. Weather information, when accessed, is also used to support crop selection and livestock management to avoid water-related conflicts.

Table 1. Climatic indicators used to predict the on-set of the rainy season

Group	Traditional indicators used	Use of meteorological information
Food Crop Farmers	◆ Temperature increase ◆ Wind direction change ◆ Cloud formation ◆ Bird calls ◆ Cessation of toad calls	Limited use
Cash Crop Farmers	◆ Nighttime heat ◆ Wind direction change ◆ Cloud formation	Limited use
Herders	◆ Heat ◆ Star patterns ◆ Toad behaviour ◆ Butterfly migration ◆ Specific bird species appearance	Very limited use, rely mostly on traditional indicators

Trust in weather information varies among producers. Some food and cashew farmers report successful crop planning based on accurate forecasts, while others find them unreliable. Herders are generally more skeptical, with some experiencing losses due to inaccurate predictions.

Producers express the need for more reliable and accessible weather information, particularly on the timing and duration of the rainy season and expected rainfall levels. Many request forecasts via television and local radio in their native languages, though low literacy remains a barrier, particularly for women farmers, some of whom express little expectation from meteorological services due to their inability to read and write. Beyond forecasts, they emphasise the need for integrated strategies that include drought-resistant seeds, artificial pastures, and permanent water points to better cope with climate variability. During a national workshop, stakeholders highlighted challenges in accessing meteorological data and building long-term partnerships with national climate service providers to tailor services to different production systems. While some cash crop value chains benefit from targeted information, often driven by the private sector, **such support remains limited for subsistence agriculture**. This gap underscores the need for more inclusive and context-specific approaches

4.3 Conflicts

When asked about the most significant conflicts related to the access to natural resources, respondents from Northern Cote d'Ivoire pointed out a variety of different typologies, including: farmer-herder conflicts; disputes about land property and access rights; fears linked

to the inflow of Burkina Faso's asylum seekers (with their cattle); clashes over irregular access into the Comoé National Park; conflicts related to the (often illegal) exploitation of mineral resources; attacks and threats by violent extremist groups. While all these conflicts are primarily shaped by socio-economic and political features, climate change contributes to exacerbating vulnerability and multiplying threats in an already fragile setting.

In particular, climate change appears to mostly impact on farmers-herder conflicts and, to a lesser extent, on conflicts related to land access and use through customary mechanisms.

Conflicts between farmers and herders have historically characterised social relations in the region. They typically arise because of cattle encroaching on agricultural fields and damaging the crops. Climate change underpins several mechanisms which may exacerbate such conflicts: a) the reduction in available water points leads to increased competition for access to both water and land near water sources; b) the irregularity of the rainy season can disrupt the interlinking of productive activities, for instance by triggering the livestock movements before the harvest, thereby leading to growing frictions; c) increasing soils' aridity may drive livestock in search of pasture in areas previously unaccustomed to rotational productive activities. These mechanisms are more easily triggered in the Bounkani region, where (semi) transhumant pastoralism remains prevalent, while they are less frequently observed in the Gontougo region, where local cattle management mechanisms reduce the opportunities for frictions between animal farming and agricultural activities.

The lack of adaptive capacity could further intensify this competition. When such conflicts arise, village committees, composed of the village chief and representatives of the farmer and herder communities inhabiting the area, oversee finding a negotiated solution between the parties. The victim is usually compensated, and mechanisms exist to make sure that compensation is paid even when the identity of the culprit is unknown. While statutory committees at sub-prefecture level are perceived as sometimes corrupt or biased towards farmers, security forces (the *gendarmerie*) is recognised as a legitimate and relatively neutral actor (despite various episodes of stigmatisation of the Fulani community, perceived to be close to Sahelian violent extremist groups). Overall, the relative legitimacy of existing dispute settlement mechanisms, both customary and modern, contribute to conflicts' appeasement. Violent escalations are rare, and most often entail retaliation against the animals.

While the existing governance of natural resources is relatively successful in mitigating the risk of conflict escalations, inadequate infrastructures can, by contrast, exacerbate the impact of climate change. Lack of functioning wells and reservoirs, over-reliance on rain-fed agriculture and unsustainable farming and herding techniques, all contribute to increasing Northern Cote d'Ivoire communities' vulnerability to climate disruptions and exposure to conflict drivers.

Tensions also exist between the landowners, affiliated to the Royal Court of Bouna controlled by the Koulango community, and the land users, mostly belonging to the Lobi community and engaged in the cultivation of cash crops. Landowners, who represent a demographic minority and fear the Lobi community's stronger political connections, hold a stake in the settlement of herders over land that had often been already allocated to farmers. The resulting proximity of herds to agricultural fields, matched with the difficulties in planning both agricultural and pastoral activities due to irregular rains, and the lack of adequate infrastructures, leads to increased opportunities for friction.

While climate change influences these conflicts, it is important to acknowledge the role of

other socio-economic causes that underpin existing conflicts over access to and use of natural resources in the region, including:

- The clash between the customary power of the Koulango and the emerging economic (and political) power of the Lobi community, and the progressive erosion of customary rules and their legitimacy.
- The exponential growth of cashew cultivation as a disruptive factor in the relationships between farmers and herders in the region: the profitability of cashew exports fuels the (often illegal) occupation of land theoretically destined for livestock and transhumance corridors, thereby increasing frictions.
- The rapid demographic growth, which quickly erodes the availability of natural resources, namely land, fueling conflicts for access and use.
- The increase in the overall number of cattle in the region, which can be linked both to a widespread interest in a relatively profitable business sector, and to a specific connection between the cattle economy and jihadist activities.[8]
- The geographic and social proximity of central Sahel to Northern Cote d'Ivoire, which increases the risk of spillover of violent contention, and exacerbates social fragmentation along ethnic, national, professional and religious divides.

5. Building adaptive solutions: addressing conflicts in a changing climate

5.1 Strengthen agro-pastoral systems for resilience

a. **Agroforestry—particularly cashew-based systems—plays a significant role in local livelihoods and holds high potential as an adaptation strategy.** However, its effectiveness depends on how it is implemented. To maximise its benefits, it should be integrated with agroecological practices such as crop rotation, minimum tillage, and improved water management, which enhance soil health, moisture retention, and diversification. Yet, these measures alone are insufficient in a context of increasing resource competition. Rangeland restoration and **conflict-sensitive land-use planning** are essential for sustainable resource management, ecosystem preservation, and reducing tensions between different livelihood groups: stretching cashew cultivations onto lands theoretically devoted to animal farming and transit is indeed reported as one of the main reasons for conflict in the region, and should be carefully avoided to minimise the risk of communal polarisation and clashes. **Additionally, farmers have explicitly called for drought-tolerant and short-cycle staple crop varieties**, which are crucial for maintaining food production amid increasingly unpredictable rainfall patterns.

b. **Support the development of inclusive grazing management plans and infrastructures that align with sustainable land-use practices and are shared at the community level**. This needs to involve both pastoral and agricultural stakeholders to mitigate the risk of overlap and encroachment. Areas exclusively earmarked for pastures should be identified, and transhumance corridors preserved to enable herders to move with their cattle without

[8] Zanoletti, G. (2023). *Le djihad de la vache. Pastoralisme et formation de l'état au Mali*. Paris: Khartala

encroaching on cultivated fields. Unfortunately, the dismantlement of the SODEPRA (*Société pour le Développement des Ressources Animales*) in the early 1990s has contributed to the occupation of many transhumance corridors. While it is unrealistic to imagine the eradication of the cultivation – mostly cashew – encroaching on former corridors, negotiations with local landowners and farming communities should be undertaken to establish new corridors featuring inclusive management schemes. Similarly, fodder banks and/or artificial pastures should be developed to help herders cope with drought periods without encroaching over agricultural land or into national parks and reserves – something we have found often happening in the Comoé National Park. Also, research findings highlight the widely felt need for enclosures to confine cattle at night, so that it does not wander on agricultural fields causing damages and fuelling conflicts. While some of these enclosures do exist, although they are sometimes of poor quality, many of those formerly maintained by the SOPDEPRA have reportedly deteriorated and should be rehabilitated.

c. **Promote the restoration, construction, and maintenance of water infrastructures to cope with unpredictable rainfall patterns.** Owing to the lack of functioning public infrastructures, the privatization of water points leads to frequent tensions among users that are exacerbated during drought periods. Uneven access to water often causes frictions between farmers and herders, too. Acknowledging the unsustainability of purely rain-fed agro-pastoral systems, the construction and restoration of hydraulic infrastructures has been identified as a vital priority by several local stakeholders. The *Direction Régionale des Ressources Animales* et Haulieutique of Bouna, together with the *Association des Eleveurs de Bovins de la Région du Bounkani* has mapped the existing small dams built by SODEPRA a few decades ago, and deteriorated since then, and has started reaching out to several donors (including GIZ, IOM and the African Climate Foundation) to restore and improve some of them. Aside from the physical rehabilitation or construction of infrastructures, attention should also be given to the sustainability of their management and maintenance mechanisms. It is therefore recommended to **facilitate the establishment of locally legitimate water management committees to mediate disputes and oversee the fair allocation of water resources**, such as the *comités de village*, made of chiefs and representatives of the various communities inhabiting the village and its surroundings. To this end, it is noteworthy existing plans of hydraulic infrastructural rehabilitation also envision the establishment of conflict-sensitive governance schemes to ensure fair access to natural resources and effective conflict settlement mechanisms. This type of intervention is likely to require limited investments yet yield significant impacts in terms of enhanced productivity and reduced conflict proneness.

5.2 Climate services

a. **Foster a coordinated, multi-level and more inclusive governance by strengthening national coordination while developing decentralised climate service hubs/platforms.** Research findings highlight the absence of tailored climate services for farmers and herders, despite local stakeholders report the existence of initiatives and pilot projects in the area. Strengthening coordination between national and local levels is crucial to co-produce climate services that are both accessible and responsive to local needs. A key step is to enhance the engagement of local communities to effectively collect and translate their needs into tailored climate services and into actionable recommendations for managing common resources and preventing conflicts. Given their existing facilitation roles within communities, extension services and *comités de village* should be further empowered in establishing effective

coordination mechanisms, particularly when developing decentralised climate service hubs or platforms. Moreover, these locally grounded institutions can play an important role in translating climate services into local languages and disseminating them, especially to certain groups, such as herders, who are particularly isolated. One of the challenges identified in the research is the difficulty of mapping existing climate service initiatives and their stakeholders. A well-structured multi-level governance system could help systematically map these initiatives, identifying overlaps, gaps, and opportunities for synergies, while leveraging legitimate actors to help enhance trust in climate information. Capacity-building efforts aimed at extension workers, farmers, and herders—such as participatory training on interpreting and applying climate data (e.g., PICSA)—could support more effective use of climate services and a better understanding of uncertainty, allowing users to engage with them more cautiously and reducing the perception of associated risks.

b. **Strengthen SODEXAM's capacity to build partnerships for the equitable delivery of reliable, user-oriented climate services.** Stakeholders report challenges in establishing long-term collaborations with SODEXAM, which limits the ability to develop a diversified portfolio of climate services, especially in rural areas, where existing services are primarily linked to cash crops and driven by the private sector. Effective co-development requires fostering integrated partnerships not only across different administrative levels (vertical) but also among diverse actors (horizontal), including institutional bodies, international organisations, the private sector, and field-based organisations/institutions such as traditional institutions, extension services, NGOs, and practitioners. Strengthening horizontal partnerships can enhance all stages of the climate services value chain, ensuring improvements from co-development and co-production to the effective dissemination of climate services, especially for subsistence farmers and herders. Lastly, **integrating climate adaptation with broader development goals**, such as education, health and economic empowerment, can help build synergies and maximise benefits for the local communities.
c. **Leverage a diverse portfolio of technologies like mobile platforms, SMS, and community radio to improve direct access to climate information**. Reducing the need for intermediaries can in fact help make the information more relevant and trustworthy. It is important to identify and utilise the technologies and dissemination channels that are considered most reliable by users, either farmers or herders, as this can further increase the relevance and trustworthiness of the information

5.3 Conflict mitigation

a. **Support existing conflict-management and peace-building initiatives**. While access to natural resources is exposed to a variety of conflict drivers, existing governance schemes, combining customary and state-based dispute settlement mechanisms, appear relatively effective and legitimate. The degree of ownership by local authorities and civil society organisations is also promising. Additional resources and training could help further increase the effective, timely and even implementation of such mechanisms, including across remote border areas. While *comités de village* are often viewed as the most legitimate venue for this kind of dispute resolutions, there are cases in which the intervention of the security forces and inspections by sub-prefectural committees are necessary. The means of the *gendarmerie* have recently been improved to enable local patrols to move around in case of need; sub-prefectural committee members, instead, are not as capable of carrying out their duties. **Adequate training and means should be provided to sub-prefectural committees** as to enhance their reliability as conflict resolution venues, as well as their legitimacy vs-à-vis the local

population.

b. **Improve control of cattle movements between Côte d'Ivoire and Burkina Faso.** In addition to historical transhumance movements between the two countries, cattle movements have recently increased both due to insecurity in the Sahelian region, and to the generalised increase in the number of heads of cattle in the broader region. Efforts have recently been made by IOM to count the number of heads of cattle and accompanying people crossing the border between Burkina Faso and Cote d'Ivoire through the Transhumance Tracking Tool, in the framework of an IOM-UNEP project on community stabilisation. Long-term engagement with Ivorian institutions and trust building measures with local communities are however of vital importance to collect a consistent data-base upon which both thorough analysis and effective policy-making can be based.

c. **Sensitise of local communities to mitigate encroachment into the Comoé National Park.** With its surface of over 1 million ha, the Comoé National Park it is one of the largest and most diversified protected areas in West Africa, and part of UNESCO World Heritage since 1983. While there seems to be no significant frictions with local communities openly contesting the interdiction of human activities in the park, herders from surrounding communities at times seek for water and pastures for their cattle inside the park. Illegal activities such as artisanal gold extraction and smuggling are also known for being carried out inside the park. Over the last few years, park authorities have developed outreach activities to raise the local population awareness of why conservation is worthwhile and beneficial to all. At the same time, more efforts could be devoted to enhancing local people's involvement in the governance of the park and the sharing of its revenues.