

Climate change risks for the West African Economic and Monetary Union reduction advanced approaches

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Abstract

In many regions of the world, economic and social development levers include economic, social, institutional and political subregional and regional integration organizations. In climate vulnerability contexts, climate change adverse effects could deteriorate these development levers, reduce their contribution to economic and social development and their impacts. A solution for reducing these risks is to integrate subregional integration organizations into national and regional climate change resilience policies.

In this article, the Badolo resilience formalism and the ClimResilience scientific framework are used to develop the Badolo UemoaClimPrsopect scientific framework. It suggests West African economic and monetary union configurations to be achieved to protect it from climate change direct and indirect adverse effects. They are governed by specific climate change impacts, vulnerability factors, resilience solutions classes.

Basically, the Badolo UemoaClimPrsopect scientific framework proposes a new approach, methodological tools, information bodies and decision making tools to efficiently build the West African Economic and Monetary Union configurations which protect it from regression dynamics linked to the impacts of climate change.

Keywords: UEMOA, Climate change, risks, reduction, scientific framework

1. Introduction

In many regions of the world, economic and social development levers include economic, social, institutional and political subregional and regional integration organizations. In climate vulnerability contexts, climate change adverse effects could deteriorate these development levers, reduce their contribution to economic and social development and their impacts. A solution for reducing these risks is to integrate subregional integration organizations into national and regional climate change resilience policies. [1-5]. The West African Economic and Monetary Union (UEMOA) includes eight countries which are Benin, Burkina Faso, Ivory Coast, Guinea Bissau, Mali, Niger, Senegal and Togo. These different countries are characterized by multiple vulnerabilities to climate change, which are risks for the West African Economic and Monetary Union principles and objectives, institutional system, financial regime and actions [6-7]. Reducing these risks is a challenge to consider for configurations of economic and monetary union on which climate change has only minor adverse effects.

This article proposes the Badolo UemoaClimPrsopect scientific framework to design, plan and implement sub-regional resilience dynamics integrating climate change risks linked the West African Economic and Monetary Union. The scientific foundations of this scientific framework are the Badolian resilience formalism which specifies which specifies the climate change resilience configurations to be achieved. The methodological tools of the ClimResilience framework are used to develop resilience trajectories information bodies. The UemoaClimPrsopect resilience scheme suggests resilience trajectories including short-term, medium-term and long-term resilience trajectory segments. [8-9].

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2. Methodology

The Badolo UemoaClimPrsopect scientific framework includes three basic parameters which are the vector y ($y_1, y_2, y_3, y_4, y_5, y_6, y_7, y_8$) associated with the eight UEMOA member countries, the climate risks vector r (r_1, r_2, r_3, r_4) and the vector u (u_1, u_2, u_3, u_4) associated with UEMOA.

The components of these vectors are:

- y_1 = Benin, y_2 = Burkina Faso, y_3 = Côte-d'Ivoire, y_4 = Guinée Bissau, y_5 = Mali, y_6 = Niger, y_7 = Sénégal, y_8 = Togo.
- r_1 = floods, r_2 =droughts, r_3 = heat waves, r_4 = sea level rise.
- u_1 = UEMOA principles and objectives, u_2 = UEMOA institutional system, u_3 = UEMOA financial regime, u_4 = UEMOA actions

The Badolo UemoaClimPrsopect scientific framework scientific foundations are the Badolian climate resilience formalism. It specifies the UEMOA resilience configuration \tilde{u} and the UEMOA member countries resilience configuration \tilde{Y} to be achieved [8]:

- $r \tilde{u} \approx \emptyset$
- $r \tilde{Y} \approx \emptyset$

3. Results

3.1. Information families for national resilience configurations

The Badolo UemoaClimPrsopect scientific framework information families for national resilience configurations are information matrices and bodies.

The elements a_{ij} ($i = 1, \dots, 4; j = 1, \dots, 8$) of the UEMOA member countries climate change direct and indirect impacts matrix A (4, 8) are [9]:

- $a_{ij} = r_{ij}jdo, r_{ij}jd1, \dots, r_{ij}jdm$

The family dy_j ($j = 1, \dots, 8$) of climate risks impacts on a country y_j is:

- $dy_j = a_{1j} U a_{2j} U a_{3j} U a_{4j}$

The climate risks impacts on the UEMOA area family dy is:

$dy = dy(dy_1, dy_2, dy_3, dy_4, dy_5, dy_6, dy_7, dy_8)$

The elements b_{ij} ($i = 1, \dots, 4; j = 1, \dots, 8$) of the UEMOA member countries climate risks vulnerability factors matrix B (4, 8) are [9]:

- $b_{ij} = r_{ij}jvo, r_{ij}jv1, \dots, r_{ij}jvm$

The vulnerability factors group $r_{ij}jvk$ ($k = 0, \dots, m$) is the group of vulnerability factors to be reduced to mitigate the climate change impact $r_{ij}jdk$.

The family vy_j ($j = 1, \dots, 8$) of vulnerability factors of a country y_j to climate change is:

- $vy_j = b1j \cup b2j \cup b3j \cup b4j$

The UEMOA area vulnerability factors to climate change family vy is:

- $vy = vy_1, vy_2, vy_3, vy_4, vy_5, vy_6, vy_7, vy_8$

The elements c_{ij} ($i = 1, \dots, 4; j = 1, \dots, p$) of the matrix C (4, 8) of the resilience solutions of the UEMOA zone to climate change are:

- $b_{ij} = r_{ijz0}, r_{ijz1}, \dots, r_{ijzm}$

The resilience solutions group r_{ijzk} ($k = 0, \dots, m$) is the group of resilience solutions to be implemented to mitigate the climate change impact r_{ijdk} .

The family zy_j ($j = 1, \dots, 8$) of the resilience solutions of a country y_j to climate change is:

- $zy_j = c1y_j \cup c2y_j \cup c3y_j \cup c4y_j$

The UEMOA area resilience solutions to climate change family zy is:

- $zy = zy_1, zy_2, zy_3, zy_4, zy_5, zy_6, zy_7, zy_8$

3.2. Information families for UEMOA resilience configurations

The Badolo UemoaClimPrsopect scientific framework Climate change risks families for UEMOA principles and objectives, institutional system, financial regime and actions are :

- $du_1 = dy(u_1) = dy_1(u_1), dy_2(u_1), dy_3(u_1), dy_4(u_1), dy_5(u_1), dy_6(u_1), dy_7(u_1), dy_8(u_1)$
- $du_2 = dy(u_2) = dy_1(u_2), dy_2(u_2), dy_3(u_2), dy_4(u_2), dy_5(u_2), dy_6(u_2), dy_7(u_2), dy_8(u_2)$
- $du_3 = dy(u_3) = dy_1(u_3), dy_2(u_3), dy_3(u_3), dy_4(u_3), dy_5(u_3), dy_6(u_3), dy_7(u_3), dy_8(u_3)$
- $du_4 = dy(u_4) = dy_1(u_4), dy_2(u_4), dy_3(u_4), dy_4(u_4), dy_5(u_4), dy_6(u_4), dy_7(u_4), dy_8(u_4)$

The combination (du) of the families du_1, du_2, du_3 and du_4 is:

- $du = du_1 \cup du_2 \cup du_3 \cup du_4$

The Badolo UemoaClimPrsopect scientific framework UEMOA vulnerability factors to climate change risks family is:

- $vu = vu_1 \cup vu_2 \cup vu_3 \cup vu_4$

The Badolo UemoaClimPrsopect scientific framework UEMOA resilience solution to climate change risks family is:

- $zu = zu_1 \cup zu_2 \cup zu_3 \cup zu_4$

Figure (1) describes the elements of the Badolo UemoaClimPrsopect scientific framework

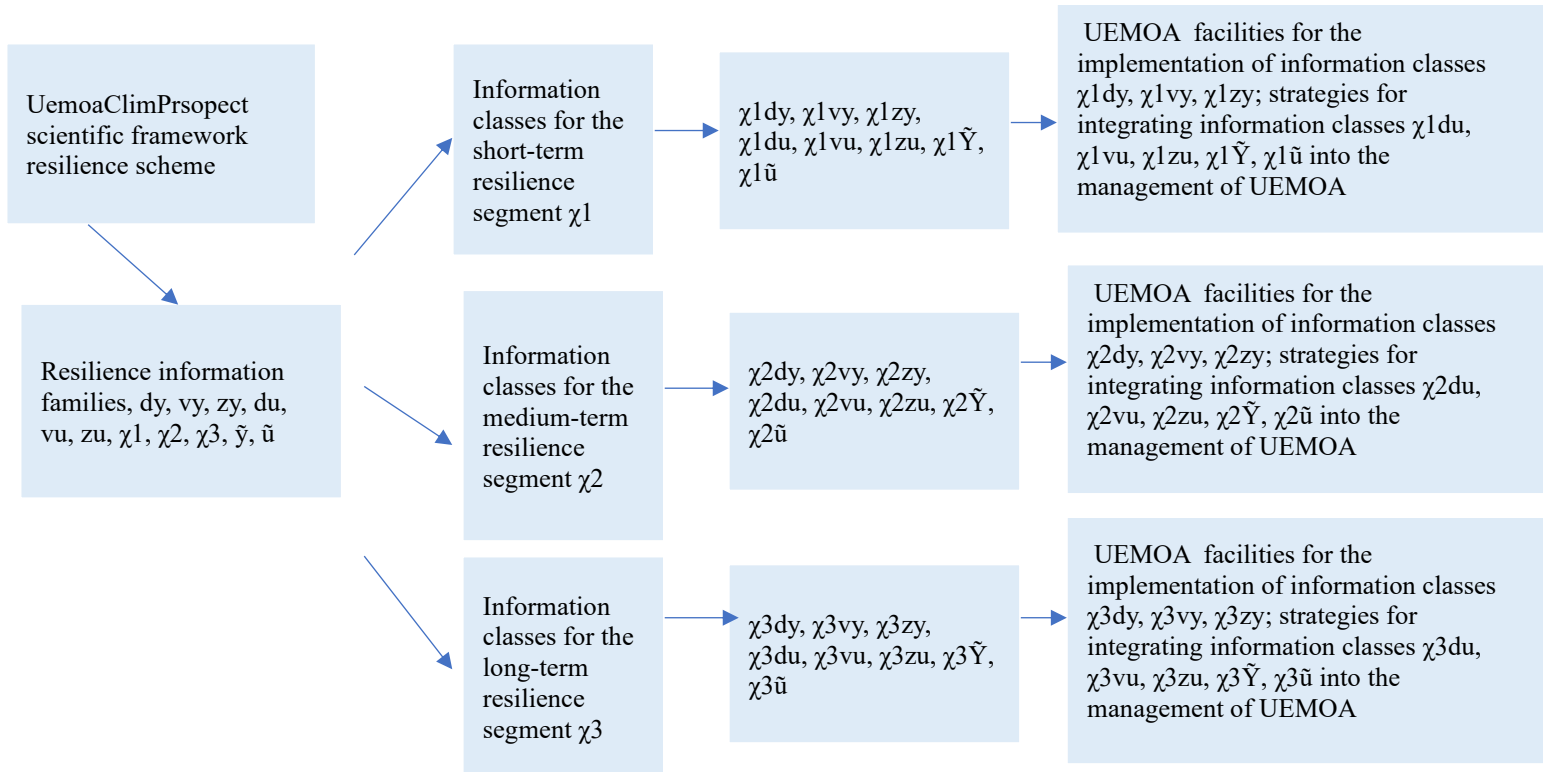


Figure (1): UemoaClimPrsopect scientific framework elements

A resilience trajectory segment χ_k ($k=1, 2, 3$) :

- mitigates a climate risk impacts class χ_{kdy} . It is a portion of the family (dy) ;
- reduces a vulnerability factors class χ_{kvy} . It is a subset of the family vy;
- implements a resilience solutions class χ_{kzy} . It is part of the family zy;
- reduces a climate change risks class χ_{kdu} . It is a subfamily of the family (du);
- reduces a vulnerability factors class χ_{kvu} . It is a subfamily of the family (vu);
- implements a resilience solutions class χ_{kzu} , which is a subfamily of the family (zu);
- achieves a configuration of resilience $\chi_{k\tilde{y}}$ to climate risks;
- achieves a configuration of resilience $\chi_{k\tilde{u}}$ to risks induced by climate change.

4. Discussion

Reducing climate change risks for the West African economic and monetary union is a complex action whose efficiency and impact are determined by the robustness and relevance of the theoretical, methodological and decision-making tools implemented. Climate change risks reduction trajectories should be based on approaches, information families and resilience schemes that achieve planned resilience objectives. The Badolo UemoaClimPrsopect scientific framework proposes a new approach, methodological tools, information bodies and decision making tools to efficiently build the West African Economic and Monetary Union configurations which protect it from regression dynamics linked to the impacts of climate change.

Theoretical and methodological tools for improving the scientific foundations of climate change risks integration into national or regional resilience policies is strongly considered in scientific literature [10-15]. The Badolo UemoaClimPrsopect scientific framework is a new scientific contribution. It results from the Badolian resilience formalism and the ClimResilience framework tools. Its Climate change impacts, vulnerability factors and resilience solutions corpuses are multi-risk and concern the UEMOA eight member countries. The resilience scheme implements the ClimResilience resilience approach to build short-term, medium-term and long-term resilience configurations. Political management of climate change resilience could integrate specific UEMOA facilities for each member country, based on the bodies of information proposed.

Fundamentally, the Badolo UemoaClimPrsopect scientific framework integrates the theoretical, methodological and decision making tools of the Badolian resilience formalism and the ClimResilience scientific framework for climate change risks reduction new scientific foundations for the West African Economic and Monetary Union.

5. Conclusion

The objective of this article was scientific foundations of climate change risks reduction for the West African economic and monetary union. The main contribution proposed is the Badolo UemoaClimPrsopect scientific framework. It results from the Badolian resilience formalism and the ClimResilience framework tools. Its Climate change impacts, vulnerability factors and resilience solutions corpuses are multi-risk and concern the UEMOA eight member countries. The resilience scheme implements the ClimResilience resilience approach to build short-term, medium-term and long-term resilience configurations. Political management of climate change resilience could integrate specific UEMOA facilities for each member country, based on the bodies of information proposed.

Fundamentally, the Badolo UemoaClimPrsopect scientific framework integrates the theoretical, methodological and decision making tools of the Badolian resilience formalism and the ClimResilience scientific framework for climate change risks reduction new scientific foundations for the West African Economic and Monetary Union

Conflicts of interest

The author declares no financial or non-financial conflicts of interest
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