Banking and insurance sector and climate change in sub-Saharan Africa: indirect risks prevention and management

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Abstract

Significant impacts of climate change on development sectors in Sub-Saharan Africa could transform this region into a context characterized by multiple indirect risks for banking and insurance sector services supply, demand and access. Deficiencies in the assessment and management of these indirect risks could intensify the difficulties of implementing banking and insurance sector resilience strategies. To be relevant and efficient, the management of the global challenge of banking and insurance sector resilience to climate change should thus integrate these indirect risks. In practice, this will require developing specific scientific tools for efficient integration of indirect risks linked to climate change impacts in the management and development of banking and insurance sector.

The main result proposed in this article is the Badolo BankAssuranceClimRisques model. It is an innovative tool for designing indirect risks induced by the impacts of climate change for banking and insurance sector prevention and management plans. It uses the approach and methodological tools of the ClimResilience scientific framework to develop information families and risks prevention and management schemes for banking and insurance sector resilience plans to the indirect risks linked to climate change impacts. Specifically, the Badolo BankAssuranceClimRisques model distinguishes short-term, medium-term and long-term risks prevention and management objectives.

In the context of sub-Saharan Africa, the Badolo BankAssuranceClimRisques model is a new scientific development for the relevance and efficiency of the banking and insurance sector resilience actions to indirect risks induced by the impacts of climate change.

Keywords: Banking, insurance, climate change, indirect risks, prevention and management model.

1. Introduction

Significant impacts of climate change on development sectors in Sub-Saharan Africa could transform this region into a context characterized by multiple indirect risks for banking and insurance sector services supply, demand and access [1-3]. Deficiencies in the assessment and management of these indirect risks could intensify the difficulties of implementing banking and insurance sector resilience strategies [4-6]. To be relevant and efficient, the management of the global challenge of the resilience of the banking and insurance sector to climate change should thus integrate these indirect risks. In practice, this will require developing specific scientific tools for efficient integration of indirect risks linked to climate change impacts in the management and development of banking and insurance sector [7-9].

In this article, we propose the Badolo BankAssuranceClimRisques model for the design of prevention and management plans for indirect risks induced by the impacts of climate change for banks and insurance companies in Sub-Saharan Africa. It uses the approach and methodological tools of the ClimResilience scientific framework to develop information families and risk prevention and management schemes for banking and insurance sector resilience to indirect risks linked to climate change impacts. Specifically, the Badolo BankAssuranceClimRisques model includes climate change impacts chains, indirect risks families, vulnerability factors to indirect risks families, resilience to indirect risks solutions families and indirect risks. Prevention and management schemes. It distinguishes short-term, medium-term and long-term risk prevention and management objectives [10].

In the context of sub-Saharan Africa, the Badolo BankAssuranceClimRisques model is a new scientific development for the relevance and efficiency of the banking and insurance sector resilience to indirect risks induced by the impacts of climate change actions.

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2. Methodology

Figure 1 describes the general structure of the Badolo BankAssuranceClimRisques model. Its elements are climate change impacts chains, indirect risks families, vulnerabilities to indirect risks families, resilience solutions to indirect risks families and an indirect risks prevention and management scheme.
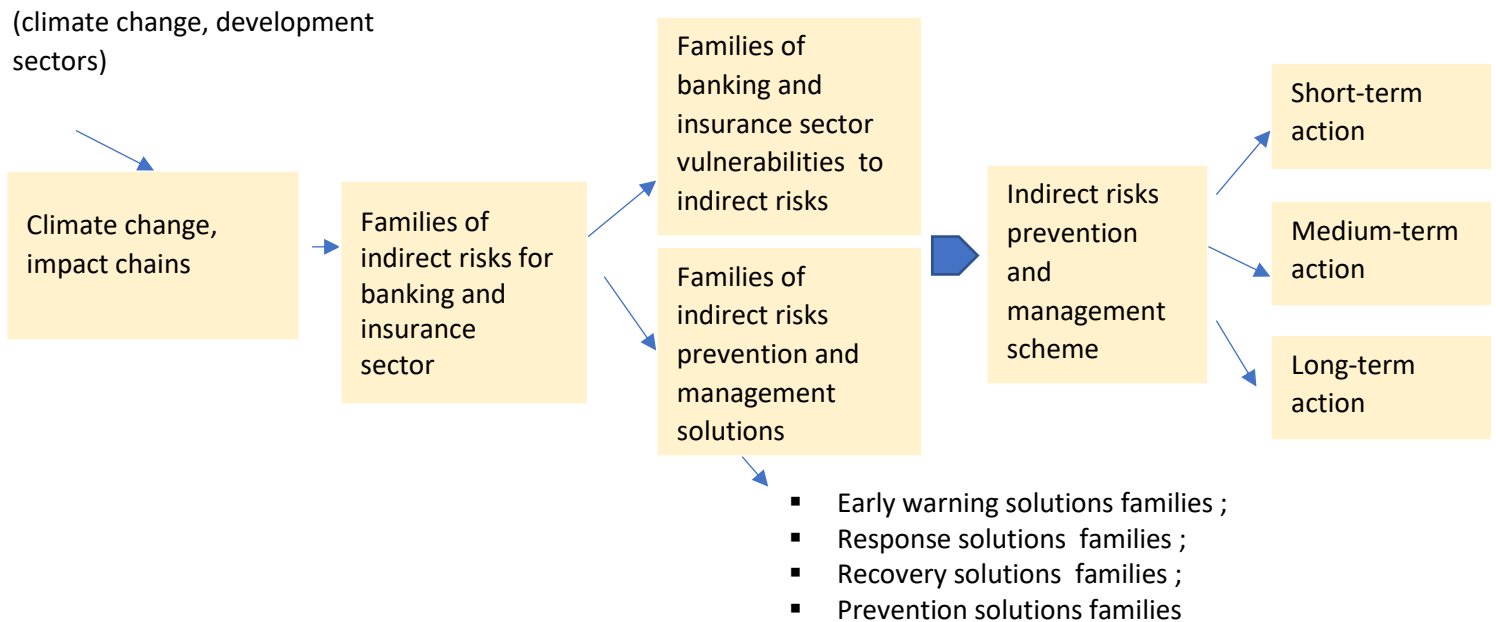

Figure 1: structure of the Badolo BankAssuranceClimRisques model

The Badolo BankAssuranceClimRisques model considers four development sectors:

- s1= economic sector ;
- s2= basic social services sector;
- s3 = natural resources sector;
- s4= infrastructure sector.

The Badolo BankAssuranceClimRisques model associates the banking and insurance sector with the vector ba (ba1, ba2, ba3, ba4, ba5):

- ba1= banking and insurance sector products and services supply;
- ba2= banking and insurance sector products and services demand;
- ba3= banking and insurance sector products and services access ;
- ba4= banking and insurance sector income;
- ba5= banking and insurance sector governance.

The Badolo BankAssuranceClimRisques model considers climate changes characterized by an increase in the frequency and intensity of extreme climatic events.

3. Results
3.1. Climate change impacts chains
Climate change impact chains ds1, ds2, ds3 and ds4 of the Badolo BankAssuranceClimRisques model are the climate change impact chains on economic, basic social services, natural resources and infrastructure. sectors. They are formally:

- dsi (i = 1, …, 4) = sid0, sid1, …, sidm

In an impact chain dsi (i = 1, …, 4), sid0 is the direct impact and sidj (j = 1, …, m) is the indirect impact of order j; m is the impacts chain length.
The four climate change impacts chains of the Badolo BankAssuranceClimRisques model are:

- ds1 = s1d0, s1d1, …, s1dm;
- ds2 = s2d0, s2d1, …, s2dm;
- ds3 = s3d0, s3d1, …, s3dm;
- ds4 = s4d0, s4d1, …, s4dm.

3.2. Information families for risks management
The first group of information families of the Badolo BankAssuranceClimRisques model is the group of indirect risks induced by climate change impacts families:

- ds1(ba) = ds1(ba1), ds1(ba2), ds1(ba3), ds1(ba4), ds1(ba5);
- ds2 (ba) = ds2(ba1), ds2(ba2), ds2(ba3), ds2(ba4), ds2(ba5);
- ds3(ba) = ds3(ba1), ds3(ba2), ds3(ba3), ds3(ba4), ds3(ba5);
- ds4(ba) = ds4(ba1), ds4(ba2), ds4(ba3), ds4(ba4), ds4(ba5).

A family dsi(ba) (i = 1, …, 4) includes:

- the sub-family dsi(ba1) of indirect risks for the ba1 component of banking and insurance sector;
- the sub-family dsi(ba2) of indirect risks for the ba2 component of banking and insurance sector;
- the sub-family dsi(ba3) of indirect risks for the ba3 component of banking and insurance sector;
- the sub-family dsi(ba4) of indirect risks for the ba4 component of banking and insurance sector;
- the sub-family dsi(ba5) of indirect risks for the ba5 component of banking and insurance sector;

The second group of information families of the Badolo BankAssuranceClimRisques model is the group of families of vulnerability factors of the banking and insurance sector to indirect risks induced by the impacts of climate change:

- vds1(ba) = vds1(ba1), vds1(ba2), vds1(ba3), vds1(ba4), vds1(ba5);
- vds2 (ba) = vds2(ba1), vds2(ba2), vds2(ba3), vds2(ba4), vds2(ba5);
- vds3(ba) = vds3(ba1), vds3(ba2), vds3(ba3), vds3(ba4), vds3(ba5);
- vds4(ba) = vds4(ba1), vds4(ba2), vds4(ba3), vds4(ba4), vds4(ba5).

A family vdsi(ba) (i = 1, …, 4) includes:

- the sub-family vdsi(ba1) of vulnerability factors of the ba1 component of the banking and insurance sector;
- the sub-family vdsi(ba2) of vulnerability factors of the ba2 component of the banking and insurance sector;
- the sub-family vdsi (ba3) of vulnerability factors of the ba3 component of the banking and insurance sector;
- the sub-family vdsi(ba4) of vulnerability factors of the ba4 component of the banking and insurance sector;
- the sub-family vdsi(ba5) of vulnerability factors of the ba5 component of the banking and insurance sector;

The third group of information families of the Badolo BankAssuranceClimRisques model is the group of families of resilience solutions of the banking and insurance sector to indirect risks induced by the impacts of climate change:

- zds1(ba) = zds1(ba1), zds1(ba2), zds1(ba3), zds1(ba4), zds1(ba5);
- zds2 (ba) = zds2(ba1), zds2(ba2), zds2(ba3), zds2(ba4), zds2(ba5);
- zds3(ba) = zds3(ba1), zds3(ba2), zds3(ba3), zds3(ba4), zds3(ba5);
- zds4(ba) = zds4(ba1), zds4(ba2), zds4(ba3), zds4(ba4), zds4(ba5).

A family zdsi(ba) (i = 1, …, 4) includes:

- the sub-family zdsi(ba1) of resilience solutions of the ba1 component of the banking and insurance sector;
- the sub-family zdsi(ba2) of resilience solutions of the ba2 component of the banking and insurance sector;
- the sub-family zdsi (ba3) of resilience solutions of the ba3 component of the banking and insurance sector;
- the sub-family zdsi(ba4) of resilience solutions of the ba4 component of the banking and insurance sector;
- the sub-family vdsi(ba5) of resilience solutions of the ba5 component of the banking and insurance sector

The indirect risk prevention and management scheme of the Badolo BankAssuranceClimRisques model considers short term, medium term and long-term risks prevention and management. Table 1 describes the three segments of risk prevention and management.

Table 1: indirect risks prevention and management segments

Indirect risks prevention and management segments	Banking and insurance sector Partial resilience configurations	Classes of indirect risks	Families of vulnerability factors	Families of resilience solutions
Short-term indirect risks prevention and management segment (h1)	ẽh1	ẽh1ds(ba) = f1(ds1(ba), ds2(ba), ds3(ba), ds4(ba))	vẽh1ds(ba)	zẽh1ds(ba)
Medium-term indirect risks prevention and management segment (h2)	ẽh2	ẽh2ds(ba) = f2(ds1(ba), ds2(ba), ds3(ba), ds4(ba))	vẽh2ds(ba)	zẽh2ds(ba)
Long-term indirect risks prevention and management segment (h3)	ẽh3	ẽh3ds(ba) = f3(ds1(ba), ds2(ba), ds3(ba), ds4(ba))	vẽh3ds(ba)	zẽh3ds(ba)

In table 1:

- $\tilde{e}hi$ is the resilience configuration of banking and insurance sector achieved by the indirect risks prevention and management segment (hi), i =1, 2, 3;
- $\tilde{e}hids(ba)$ = fi(ds1(ba), ds2(ba), ds3(ba), ds4(ba)) is the class of indirect risks to be addressed by the indirect risk prevention and management segment (hi), It is a combination of indirect risks families, i =1, 2, 3;
- $v\tilde{e}hids(ba)$ is the family of vulnerability factors of the banking and insurance sector to be reduced by the indirect risks prevention and management segment (hi), i =1, 2, 3;
- $z\tilde{e}hids(ba)$ is the family of resilience solutions of the banking and insurance sector to be implemented by the indirect risks prevention and management segment (hi), i =1, 2, 3.

4. Discussion

The challenge of integrating indirect risks induced by the impacts of climate change on development sectors includes the development of specific models for indirect risks prevention and management. The Badolo BankAssuranceClimRisques model proposed is a singular scientific achievement for the banking and insurance sector resilience. Its information families and resilience schemes are specific elements for a results-based indirect risk prevention and management plan.

The scientific tools of the banking and insurance sector resilience are discussed in several publications. The results of this article contribute to improving knowledge for the banking and insurance sector resilience configurations. However, they are distinguished by their approach, methodological tools and families of information for the development of resilience plans. [11-15].

The singularities of the Badolo BankAssuranceClimRisques model essentially result from the use of climate change impacts chains. They concern the main development sectors and integrate climate change indirect impacts. The families of indirect risks thus concern the main development sectors in interactions with banking and insurance sector. The indirect risks families establish the relevance of the proposed model. Vulnerability is the essential information that guides risk reduction actions. The Badolo BankAssuranceClimRisques model includes vulnerability factors families relating to the five dimensions ba1, ba2, ba3, ba4 and ba5 of the banking and insurance sector. They underpin the efficiency of this model. The resilience solutions of the Badolo BankAssuranceClimRisques model are based on the vulnerability factors of the banking and insurance sector to indirect risks induced by the impacts of climate change. They are the performance factor of the model.

The Badolo BankAssuranceClimRisques model implements for the banking and insurance sector the concepts of residual impacts, residual vulnerabilities, resilience configurations, impact classes to establish efficient risk prevention and management schemes.

In the context of sub-Saharan Africa, the Badolo BankAssuranceClimRisques model is a new scientific development for the relevance and efficiency of the banking and insurance sector resilience to indirect risks induced by the impacts of climate change actions.

5. Conclusion

The objective of this article was the scientific tools for efficient integration of indirect risks induced by the impacts of climate change on development sectors in the management and development of banking and insurance sector.

The main result proposed in this article is the Badolo BankAssuranceClimRisques model. It is an innovative tool for designing indirect risks induced by the impacts of climate change for banking and insurance sector prevention and management plans. It uses the approach and methodological tools of the ClimResilience scientific framework to develop information families and risks prevention and management schemes for banking and insurance sector resilience plans to the indirect risks linked to climate change impacts. Specifically, the Badolo BankAssuranceClimRisques model distinguishes short-term, medium-term and long-term risks prevention and management objectives.

In the context of sub-Saharan Africa, the Badolo BankAssuranceClimRisques model is a new scientific development for the relevance and efficiency of the banking and insurance sector resilience actions to indirect risks induced by the impacts of climate change.

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

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