

Through *Perspective*, CIRAD provides an opportunity to explore new avenues for discussion and action based on research.

## TerriStories<sup>®</sup>, a serious game to improve long-term autonomous management of natural resources and land

Patrick d'Aquino

**Although participatory and inclusive approaches have been recognised as necessary for involving local people in the management of resources and territories, their impact often remains limited in the long term, whether at the local level or for broader territories. Based on this observation, a CIRAD team developed a method in the late 1990s using a serious game, TerriStories<sup>®</sup>. The effects of the first trial in Senegal in 1998–1999 are still**

**seen today at the local and national levels. Applied to the management of local territories, then to the definition of national land and environmental regulations, the method has succeeded – in all of the countries in which it has been deployed – in driving collective endogenous proposals that the actors themselves then deliver and implement according to their own requirements.**

Since the 1980s, participatory approaches have been used to support local initiatives. However, their analytical tools are often more suited to expressing scientific knowledge than to taking account of the concerns and knowledge of local populations. Involving local people in the management of their territory and better integrating their points of view into analyses remains a challenge and a priority. Based on this observation, a participatory approach (TerriStories<sup>®</sup>) was tested in the late 1990s. It provides local actors with analysis and foresight tools that they can use on their own, in order to co-develop and simulate their own proposals for territorial management.

### A generic methodology for participatory simulation

TerriStories<sup>®</sup> is based on a strategic hypothesis: in order to obtain lasting impacts up to inclusive levels of decision making, stakeholders must be empowered to implement the process as independently as possible from external support, both in their local territory and, more broadly, up to these inclusive levels of decision making.

The TerriStories<sup>®</sup> method is one of the results of CIRAD's 20 years of experience in participatory simulation methodologies based on the ComMod (companion modelling) approach.

The design of TerriStories<sup>®</sup> involved two phases. In the late 1990s, it was launched to support the collaborative management of local territories. Then, in the late 2000s, the method was refined to enable the collaborative definition of collective national regulations and to ensure it could be used by all development actors after a short training period.

It includes two elements:

> a participatory, specific and easy to reproduce simulation tool, in the form of a game (a set of components including different pieces and several boards);

> a strategic approach to achieve the specific participation goal, focusing on the initial involvement of key local actors, in order to ensure the emergence or consolidation of an autonomous collective dynamic for endogenous proposals.

With the TerriStories<sup>®</sup> participatory simulation tool, at the beginning of the session the participants build their own serious game that best suits their specific concerns. They develop a simulation game covering all of their different points of view on the issue in question in order to ensure a constructive dialogue between the knowledge and experience thus gathered. Environmental, economic and social uncertainties are then introduced into this co-developed tool, leading participants to make their own operational rules in order to address them.

### The first trial in Ross Béthio in Senegal: addressing local challenges

Describing the first application of TerriStories<sup>®</sup> will better illustrate its nature. In Senegal in the late 1990s, the local authorities were faced with two challenges. First, although decentralisation had transferred territorial management responsibilities to them, they were not recognised by most national stakeholders – from technical services to local people – as being sufficiently competent to undertake these duties. The other challenge was to mitigate conflicts between agriculture and livestock farming. With the expansion of agricultural land, areas available for livestock were shrinking and it was becoming crucial to reserve land for this activity. Yet national policy makers were convinced that livestock farming should continue to make do with unused areas.

To meet these two challenges, in 1998 and 1999 a tripartite team of researchers (CIRAD and ISRA, Institut sénégalais de recherches agricoles - Senegalese Institute of Agricultural Research), development officials (SAED, Société nationale d'aménagement et d'exploitation des terres du delta du fleuve Sénégal - Senegal River Delta Development and Exploitation

Society) and local officials from the rural community of Ross Béthio tested the approach in this local authority covering 2 500 km<sup>2</sup> in the Senegal River Delta. With this support, in less than a year, the local elective authority had set its own collective land use rules, formalised as a Plan d'occupation et d'affectation des sols (POAS, Land Use Plan), using participatory maps that it had learnt to produce with its inhabitants. The effects are still visible more than 20 years on at the local, national and even sub-regional levels.

## Autonomous deployment throughout the country

In Senegal, the approach was recognised by the Council of Ministers in 2004 and the President of the Republic asked for it to be extended to the whole country. Even though no resources or specific support policies were subsequently implemented, it spread thanks to initiatives by municipalities, civil society organisations and different development support programmes.

Following the departure of the support team, the Ross Béthio local authority worked for six years by itself to successfully mobilise the means required to carry out the work identified with its inhabitants in order to support the new organisation of its territory [see photos below].

This approach was also taken up in neighbouring countries: local stakeholders (local officials and SAED development officials) reproduced this POAS in the Senegal River region and participated in its dissemination in other countries (Burkina Faso, Mali, Côte d'Ivoire, etc.).

Today in Senegal some 50 experts have mastered the approach and have just spontaneously formed a community of practice, in order to preserve the initial participatory principles.

The Ross Béthio POAS was the first Senegalese document in which specific zones were officially set aside for pastoralist use. This was replicated in the other POAS documents, meaning this new recognition of specific areas for livestock farming was thus applied to the whole country. In 2014, the president of the Commission nationale de réforme foncière (CNRF - National Land Reform Commission) said that transhumance in Senegal should be eligible for "pastoral leases", which was an important development. As of 2023, all of the POAS currently in effect include areas in which pastoral activity is recognised as a priority.

## Also addressing national challenges

In the late 2000s, the approach was improved so that it could be used in many different places within a country by a team solely composed of local facilitators, with a view to enabling collaborative policy making (land reforms, environmental codes, sector organisation, etc.) [see box p. 3].

First, a game platform was developed that could be used in any territorial context and at various scales. It is made up of several wooden boards that participants use to represent a range of

different territories, according to their own point of view, which they can then integrate into the rules they create and simulate. On these boards, the participants introduce the collective management rules they devise, which they will apply when they simulate their activities. They also introduce uncertainties suggested to them, such as increasing climate variability, a bushfire, the arrival of transhumant pastoralists or of a foreign investor, as well as others that they conceive during the game.

The platform can thus be used either at the country level, with each board representing a part of the country, or at very local levels, with each board symbolising a few farms – this is how it was applied in Senegal by a farm insurance programme, in order to work with farmers to define several options for public support for agriculture.

This platform therefore retains the participatory principles of the Ross Béthio experiment (participants' definition of collective rules and uncertainty scenarios, with a key role given to improvisation), while presenting them in a material form that is easy to reproduce and can be led by local development facilitators. Workshops can be held at different organisational levels and on different territorial scales. A learning-by-doing programme lasting a few weeks has been created to support facilitators in this large-scale implementation.

In 2014, the Cadre de réflexion et d'action de la société civile sur le foncier au Sénégal (CRAFS - Civil Society Alliance for Research and Action on Land Tenure in Senegal) decided to use TerriStories® in order to implement a new bottom-up process for the collaborative drafting of farming directives for land reform. The NGO members of the CRAFS organised, financed and facilitated workshops throughout the country, then sought assistance from national experts to draft their conclusions and, finally, implemented a political support strategy among decision-makers in charge of the land reform. In 2015, this process spread considerably, both horizontally (around 20 workshops organised throughout the country) and vertically (three national workshops), thanks to funds mobilised by civil society itself. The effects are national, as these "farming directives for land reform" have been discussed with the CNRF (National Land Reform Commission) and have led to considerable changes in its proposals. They are also local, with participants in places where workshops were held applying some of the rules envisaged (contracts with agribusiness, zoning between activities, access to land for women, etc.).

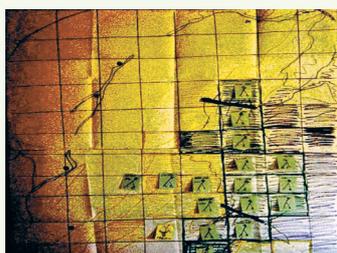
## Prioritising the autonomy of stakeholders

Whether they are farmers, local officials or civil society leaders, the stakeholders rapidly understand that TerriStories® support remains methodological and does not propose development choices, and that they are very much in control of the process. Early on, they choose the priority subject. Next, the foresight "game" offered is designed in such a way as to enable stakeholders to control and modify all of its elements. Later on, the implementation of the resolutions they make is entirely their own responsibility. This is what prompts their wholehearted

### From game to reality in Ross Béthio: the works simulated in 2000 were built six years later

#### April 2000

During simulations for the Ross Béthio POAS, priority works were identified (two channels) to better manage competition between agriculture and livestock farming, with separate water supplies for the two activities.



#### 2006

The local communities built the two channels themselves, with no financial support from the team.



Photo P. d'Aquino; © 2006 Google/Europa Technologies/DigitalGlobe/Terrametrics - Source: d'Aquino and Papozian (2014).

## TerriStories® applies to numerous territorial issues concerning natural resources: some examples

- **In Myanmar**, in 2017, TerriStories® was used by Lake Inle stakeholders to reflect on an agroecological transition in order to reduce pollution in the lake [institutions: CIRAD; Department of Agriculture, Ministry of Agriculture, Livestock and Irrigation, Myanmar].
- **In Vietnam**, since 2017, the NGO CISDOMA has been using TerriStories® to support the agroecological transition [video, <https://www.youtube.com/watch?v=-XBwLoEHUUQ>].
- **In Côte d'Ivoire**, since 2016, the NGO Association de Soutien à l'Autopromotion Sanitaire et Urbaine (ASAPSU) and INADES-Formation have been using TerriStories® to pacify an inclusive land governance process [CIRAD, 2019. TerriStories® in Côte d'Ivoire. Video, <http://www.terristories.org/media/videos/ressources/video01.mp4>].
- **In Senegal**, as part of the BIODEV 2030 project (2019-2022, <https://www.biodev2030.org/en/>), the International Union for Conservation of Nature (IUCN) has used TerriStories® to implement voluntary commitments from users for biodiversity protection [IUCN, 2023. BIODEV2030 in Senegal: some testimonials from participants in the serious game sessions. Video, <https://www.iucn.org/story/202304/agriculture-and-fisheries-stakeholders-senegal-ready-act-biodiversity> – see also <https://www.youtube.com/watch?v=3RywrRN7zSk>].
- **In Burkina Faso**, since 2016, the Forest Investment Program (FIP) has been using TerriStories® to establish integrated natural resource management in different municipalities throughout the country [Braune L., 18/09/2018. Burkina Faso: Unlocking economic growth through integrated natural resource planning and governance. Nasikiliza Blog, World Bank, <https://url.cirad.fr/perspective63a>].

commitment to the process. It is also what prompts the – often voluntary – mobilisation of local technicians, experts and academics who hope for greater recognition of local stakeholders. Driven by their shared belief in the ability of this method to support and operationalise endogenous visions of development, they give their own time and energy to organise simulation workshops and to subsequently develop the best strategies for implementing their resolutions. This is what explains the lasting impacts in inclusive decision-making processes.

To achieve this, two principles are what make TerriStories® original. First, the game materials are designed to give participants maximum flexibility, letting them design their own simulation game and putting them in action situations in which they can express any ideas they wish, without the need for formal discussions or written documents (including maps). The elements of the game are only intended to encourage participants to refine their proposals at the operational level. This flexibility reveals the reality of behaviours: for example, participants often improvise situations of corruption that no element of the game suggests they should take into account.

Second, the approach is based on a socio-institutional strategy developed with stakeholders that prioritises the constraints to be removed (improving knowledge, learning new skills, altering the balance of power, changing attitudes, etc.), according to the principle of pragmatism “think small, do big”. The challenge is to identify the minimum level of progress that can reasonably be targeted in the given context, then to undertake the key actions needed to achieve this, whatever their nature and whatever the scale at which they are situated (training, lobbying, signing a convention, publicity, partnership networks, etc.).

The deployment of TerriStories® was structured in accordance with the challenge of full transfer to development institutions. An international network of trainers was progressively created (West Africa, Southeast Asia, Europe), informed by the different uses. A contractual formula was established for the transfer

of implementation to private operators (associations, NGOs, consultancies), combined with intellectual protection and scientific monitoring in order to preserve its participatory nature in delegated applications. Today, TerriStories® is used by many different teams, supervised by trainers during their first operations, while maintaining the participatory and inclusive nature of the initial research approach.

## Better specifying impact: effects that improve “capabilities” as defined by Amartya Sen

This deployment intensifies feedback from participants, facilitators and donors, who highlight the originality and effectiveness of the participatory nature of TerriStories®. However, they also stress the need for progress in terms of formalising the specific challenges of the approach and the particular effects it pursues – effects the participants feel but that are difficult to grasp for non-participants. Today, the research challenge for TerriStories® is to clarify these effects for non-participants.

The effects targeted by TerriStories® are comparable to the development of “capabilities” as defined by Amartya Sen, Nobel Prize winner in economics in 1998. A. Sen defines capabilities as the set of functionings that a person has effective access to in order to achieve their objectives. The more different functionings available to a person, the greater their freedom of choice, and the magnitude of this freedom is the best indicator of their individual capabilities. The goal is not achieve a one-off collective analysis, action or decision. The goal of TerriStories®, which sets it apart from other participatory approaches, is to bring about a collective, autonomous dynamic that can work permanently, without support, to produce operational collective analyses, actions and decisions.

However, the frameworks for operational formalisation of this type of capacity building need to be better designed and validated, which leads to criticism regarding the operationalisation of A. Sen’s theory. The TerriStories® experiment simultaneously specifies the operational consequences of A. Sen’s approach and the effects targeted by TerriStories®: first by reformulating the TerriStories® objectives according to A. Sen’s framework, then by developing a monitoring and assessment analysis grid that highlights the five TerriStories® objectives reformulated according to this framework:

- > increasing the number of pathways and strategies envisaged by the participants to achieve the objectives they set themselves – “freedom” (according to A. Sen’s theory);
- > improving their judgment capabilities, both individual and collective, to identify the most relevant pathways among these;
- > improving their engagement capabilities, both individual and collective, to implement the most relevant pathways – “agency”;
- > improving their capabilities to mobilise resources, both tangible and intangible, to achieve their goals – “conversion factors”;
- > having indirect impacts on non-participants.

Today, the challenges are to develop an operational framework that can be used to gather information on the observed effects of TerriStories® in order to feed and illustrate the above analysis grid. The deployment of TerriStories® helps to progress in the operational formalisation of A. Sen’s theory: this is of interest to the community working to improve the operational translation of this theory as well as to the TerriStories® network, since this operationalisation better specifies the effects targeted by the approach and those obtained. ■

The TerriStories® method presented in this *Perspective* n° 63 is led by the SENS Joint Research Unit [Knowledge, Environment, Societies, <https://umr-sens.fr/>]. This method was tested for the first time in Senegal from 1998 to 2014 by CIRAD with its partners, the Société nationale d'aménagement et d'exploitation des terres du delta du fleuve Sénégal (SAED - Senegal River Delta Development and Exploitation Society, <http://85.90.245.131/saed2-bis/>) and the Institut sénégalais de recherches agricoles (ISRA - Senegalese Institute of Agricultural Research, <https://isra.sn/>) from 1998 to 2002, and with the NGO Enda Pronat (<https://endapronat.org/>) from 2012 to 2014.

The TerriStories website (<http://www.terristories.org/>) has been developed in French and English to gather the resources needed for the application of this approach.

Its participatory management game is described on CIRAD's website (<https://www.cirad.fr/en/work-with-us/cirad-innov-solutions/products-and-services/terristories>).

A short film presents the approach: Defalt Q., 2014. Du terroir au pouvoir. Jeu, théâtre et simulation pour des règles collectives. Paris, Comité Technique Foncier et Développement, Ministère Français des Affaires Étrangères et du Développement International, Agence Française de Développement (AFD). Short film, 26 minutes. <https://www.dailymotion.com/video/x28rttd>.

A first review of the approach in Senegal was published by *Perspective* in 2015 [d'Aquino P., 2015. Participatory development of collective rules for natural resource and land management. Lasting effects from the local to the national level. *Perspective* 33. <https://doi.org/10.19182/agritrop/00026>]. Issue 63 updates the longer-term results and impacts of this work, as well as the most recent applications.

Other publications based on this work include:

d'Aquino P., Ba A., Bourgoïn J., Cefai D., Richebourg C., Hopsort S., Pascutto T., 2017. Du savoir local au pouvoir central : un processus participatif sur la réforme foncière au Sénégal. *Natures, Sciences, Sociétés* 25 (4) : 360-369. <https://doi.org/10.1051/nss/2018001>

d'Aquino P., 2016. TerriStories, un jeu au service de l'invention collective dans les politiques publiques. *Animation, territoires et pratiques socioculturelles* 10 : 71-80. <https://doi.org/10.55765/atps.i10.579>

d'Aquino P., Bah A., 2014. Multi-level participatory design of land use policies in African drylands: a method to embed adaptability skills of drylands societies in a policy framework. *Journal of Environmental Management* 132: 207-219. <https://doi.org/10.1016/j.jenvman.2013.11.011>

d'Aquino P., Papazian H., 2014. An Inclusionary Strategy Reaching Empowering Outcomes Ten Years after a Two-Year Participatory Land Uses management. *Environmental Management and Sustainable Development* 3 (2): 154-181. <https://doi.org/10.5296/emsd.v3i2.6595>

d'Aquino P., 2009. La participation comme élément d'une stratégie globale d'intervention : l'approche « gestion autonome progressive ». *Cahiers Agricultures* 18 (5) : 433-439. <https://doi.org/10.1684/agr.2009.0330>

d'Aquino P., Le Page C., Bousquet F., Bah A., 2002. A novel mediating participatory modelling: The 'self-design' process to accompany collective decision making. *International Journal of Agricultural Resources, Governance and Ecology* 2 (1): 59-74. <https://doi.org/10.1504/IJARGE.2002.000022>

Papazian H., d'Aquino P., Bourgoïn J., Ba A., 2016. Jouer avec diverses sources de régulation foncière : le pluralisme Sahélien. *Économie Rurale* 353-354 : 27-44. <https://doi.org/10.4000/economierurale.4904>

## Some links

CIRAD. ComMod: The Companion Modelling Approach. <https://www.commod.org/>

Enda Pronat, 2022. Cadre de réflexion et d'action de la société civile sur le foncier au Sénégal, CRAFS. <https://endapronat.org/reseaux-partenaires/cadre-de-reflexion-et-daction-sur-le-foncier-au-senegal/>

Étienne M. [coordinator], 2010. La modélisation d'accompagnement. Versailles, Éditions Quæ, 384 p. Free for download at <https://www.quae.com/produit/150/9782759213894/la-modelisation-d-accompagnement>

Inades-Formation. <https://www.inadesformation.net/en/>

Ministry of Environment, Green Economy and Climate Change, Burkina Faso. Forest Investment Program (FIP). <https://www.pif-burkina.org/>

Sen Amartya, December 8, 1998. Prize Lecture. The Possibility of Social Choice. <https://www.nobelprize.org/prizes/economic-sciences/1998/sen/lecture>

## A few words about...

**Patrick d'Aquino** is a geographer in the SENS Joint Research Unit [Knowledge, Environment, Societies, <https://umr-sens.fr/>]. Working for better integration of stakeholders' viewpoints in territorial management tools (maps, GIS, simulations), he is one of the founders of the ComMod network (Companion Modelling, <https://www.commod.org/>) and has since continued to improve participatory simulation methodologies. He is also an expert on land and the management of common resources in the Sahel and Southeast Asia.

[patrick.daquino@cirad.fr](mailto:patrick.daquino@cirad.fr)



42, rue Scheffer  
75116 Paris • France  
[www.cirad.fr](http://www.cirad.fr)

**Publication Director:**  
Élisabeth Clavier de Saint Martin,  
CIRAD Chief Executive Officer

**Editors:** Patrick Caron,  
UMR ART-Dev (Actors, Resources and  
Territories in Development)

Cécile Fovet-Rabot, Scientific and Technical  
Information Service

Étienne Hainzelin (Researcher Emeritus),  
General Management

**Translation:** Anna Kiff

**Graphic design:** Laurence Laffont

**Distribution:** Nolwenn Langlade, Scientific and  
Technical Information Service

<https://revues.cirad.fr/index.php/perspective>  
perspactive ISSN-L 2275-9190 - **Email :** [perspective@cirad.fr](mailto:perspective@cirad.fr)



<https://muse.edu.umontpellier.fr>

 This article is provided under the terms of the Creative Commons License CC-BY 4.0: Attribution 4.0 International <https://creativecommons.org/licenses/by/4.0>

**To cite this document**  
d'Aquino P., 2023. TerriStories®, a serious game to improve long-term autonomous management of natural resources and land. Montpellier, CIRAD, *Perspective* 63. <https://doi.org/10.19182/perspective/37290>