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The SAMBA Role Play Game in Northern Vietnam

An Innovative Approach to Participatory Natural Resource Management

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The present article describes an experiment using the SAMBA role play game as a research tool in Bac Kan province of Vietnam, in the framework of the Mountain Agrarian Systems Program, a joint research project of the Vietnam Agricultural Science Institute, the International Rice Research Institute, the Institut de Recherche pour le Développement, and the Centre de Coopération Internationale en Recherche Agronomique pour le Développement. The role play game was a follow-up to intensive field surveys and multi-agent modeling done in the same commune. We present the game and its rules, the sequence of events during a role play session, and an analysis of the process. The results of this experiment show that role play can be a useful tool, both for validation of hypotheses about the forces behind land use change and for conducting participatory research on natural resource management.

The need to assess land use dynamics

One of the goals of the Mountain Agrarian Systems (SAM) Program is to understand agricultural dynamics in Bac Kan province of northern Vietnam and their implications for land use change from village to provincial level (Figure 1). The SAMBA multi-agent model was developed for this purpose, to explore how successive lowland allocations at the end of the collective period affected the use of uplands. The main finding of the study was that from 1982 to 1990, the choice between opening upland fields or growing cash crops could be explained by family demographics (ratio between mouths to feed and labor force). On this basis, it was possible to hypothesize the absence of coordination between agents, who were playing a mainly reactive role.

Field studies conducted in Bac Kan province indicated that land use dynamics after 1990 were much more complex and diverse. In order to characterize the diversity of these dynamics without having to conduct time-consuming multiple field studies, we had to develop a new methodology. We chose to derive a gaming-simulation approach from the multi-agent model; we kept the basic structure and function of the modeled environment, but transposed it onto a game board. Players



FIGURE 1 Mosaic of land use types in an agricultural landscape in Bac Kan province. (Photo by Jean-Christophe Castella)

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TABLE 1 Players' positions, assets, and liabilities at the beginning of role play.

Player	Mouths to feed	Labor force	Paddy field area (*bungs*)	Labor surplus*	Labor force / mouths to feed
A	5	5	1	4.5	1
B	5	5	1	4.5	1
C	5	5	1	4.5	1
D	4	4	3	2.5	1
E	3	2	3	0.5	0.66
F	8	4	3	2.5	0.50
G	7	3	2	2	0.42
H	7	3	2	2	0.42
I	5	2	1	1.5	0.40
J	8	3	2	2	0.37

* "Labor surplus" designates the available labor force after allocating labor force to paddy field cultivation.

(farmers) were then introduced to this environment, in which their actions were constrained by only a few general rules.

In 2000 the SAMBA role play game was tested for the first time in Xuat Hoa commune, Bac Kan town, with the active participation of 10 farmers from Ban Don village. The farmers were selected for their representativeness after a one-year period of fieldwork carried out in this commune. The role play was conducted during a whole-day meeting with the farmers.

The game

The game board consists of 1600 wooden cubes, each representing a plot of 1000 m^2 or 1 *bung* (a traditional unit of land measure in northern Vietnam). The 6 sides of each cube are painted with different colors representing different land uses and land covers (forest, paddy fields, upland rice, etc). At the beginning of the simulation, the game board was prepared to represent a forest and a village along the banks of a river. Each player then drew a "household" card consisting of 2 factors—mouths to feed and labor force—and an assignment of need (300 kg paddy/year/person). Each player also drew a "paddy field" card determining his or her area of paddy field (between 1 and 3 *bungs*). The combinations of family structures and paddy field areas resulted in very different individual situations (Table 1), which changed radically by the end of the game (Table 2).

During the successive rounds of play, each representing one year, the players had to decide how to allocate their land, labor, and capital. They might grow lowland rice (1 or 2 cycles/year), clear forest to grow upland rice, plant cash crops, buy buffaloes, etc. At the end of each round, the facilitator distributed "paddy cards" to the players, representing production from the various crops. The production patterns were derived from field data and standardized for the requirements of the game.

Playing the game

First round

In the first round, all the players chose to allocate at least part of their spare labor force to the growing of upland rice, even those who had enough paddy fields to meet their needs. Some players realized at the very beginning that if they did not grow upland rice they would not have enough rice at the end of the first round, so they used their available labor force to grow upland rice. Others made careful calculations, choosing the fewest upland rice plots needed to meet immediate con-

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TABLE 2 Players' positions, assets, and liabilities (in kg of rice) after six rounds.

Player	Mouths to feed	Labor force	Buffaloes	Paddy fields	Loaned to other players (kg)	Outstanding debt (kg)	Savings (kg)	Savings + loans + buffaloes – debt
A	5	5		1	1150		8900	10,050
B	5	5	2	1	990		4490	7480
C	5	5	4	1	1320		800	6120
D	4	4	1	3	2520		6900	10,420
E	3	2	1	3	2280		2720	6000
F	8	4	1	3	300	1780		–480
G	7	3		2		2420		2420
H	7	3		2		940		–940
I	5	2		1		2840	260	2580
J	8	3		2		1600	400	–1200

sumption needs, and reserving the rest of their labor force to grow cash crops. A third group of players seemed more confused and tried to imitate other players, but without making careful calculations. They were attracted by the higher productivity of cash crops (450 kg/*bung*/year) relative to upland rice, not realizing that they might not have enough rice for immediate consumption needs.

At the end of the round, players who had many upland rice plots had quite a lot of surplus. By contrast, some of the players who planted cash crops instead of upland rice did not have enough rice to consume. They had to borrow from other players to meet their first-round consumption needs.

Second round

Many players converted their upland rice plots to cash crops (Figure 2). Some decided to do so even though they had to borrow rice for several rounds because, according to their calculations, after 5 rounds they would be able to pay off the debts and make a profit. On the other hand, those who had planted cash crops instead of upland rice and had to borrow from the others at the end of the first round decided to abandon the cash crop plots to grow upland rice, otherwise they would have to borrow increasingly in the coming rounds.

Third round

Because upland rice yields decrease markedly in the second and subsequent years of cropping, many players abandoned their old plots and moved to other plots. This was especially true for the indebted players.

Fourth round

By the fourth round, players had markedly different options, depending on how much rice surplus they had been able to accumulate in previous rounds. On the one hand, the "well-to-do" players were accumulating more and more rice and looking forward to the fifth round, when they would be able to "harvest" their first cash crops. On the other hand, the "poor" players kept borrowing rice, and continued to take new plots for upland rice each round.

Fifth round

Many players had quite a surplus of rice in this round because they harvested the cash crops that they had planted during the first round. By now, many players had enough rice to barter for buffaloes.

Sixth round

Some of the players who had difficulties at the beginning now had enough rice to pay their debts (see Table 2). One could expect that it would be easier for some of

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FIGURE 2 A woman player from the Tay ethnic group selects the plot she wants to convert from forest to upland crops by turning a wooden cube. She is assisted by a facilitator from the Mountain Agrarian Systems Program. (Photo by Jean-Christophe Castella)

them in the coming rounds, thanks to the cash crops, production of which began only after 5 years.

Debriefing session with the players

The facilitators stopped the role play after 6 rounds and initiated discussion. First, they asked the players about their reactions to the role play. All the players thought that the role play was very practical and helpful. Some of them were quite confused at the beginning and made mistakes. But the further the role play went, the wiser the players became. Their decisions became more reasonable. As a result, their condition gradually improved.

Some players thought that the environment would be seriously damaged if they chose the plots near the river for upland rice, especially if they abandoned the upland rice plots after just one year of cultivation. All the forests nearby would be destroyed and the land consequently eroded. Nevertheless, they continued practicing slash-and-burn, cutting down trees to obtain high, first-year production of upland rice.

In response to the question about whether the role play approximated reality, most players agreed that the conditions and the process of the role play were quite similar to real life: many people in their village lived under similar conditions. However, they recommended some changes in the rules: the introduction of intercropping, a low density of upland rice among the trees of the cash crop, and the possibility for players to grow non-rice crops (beans, potato, peanuts, etc) on the one-cycle paddy plots to increase income.

The third question the facilitators put to the players was whether they had ever thought of electing one player to be the head of their imaginary village. All the players said that they had not thought of this, but agreed that if there had been a village head things would have gone differently, eg, the head could have helped the players who had difficulties, set limits to certain activities, etc.

Lessons applicable to reality

Discussion following the role play (Figure 3) revealed a strong awareness about environmental matters and, more precisely, about the dangers of deforestation along rivers. Nevertheless, in the absence of clear regulations (and penalties associated with the regulations), players (farmers) did not take environmental degradation into account when making their decisions. Because the plots along the river were closest to the village and the paddy fields, they were the first to be cleared.

From an individual point of view, given the initial situation of players (ie number of paddy fields and household composition), a distinction can be made between those who obtained enough rice from their paddy fields to cover the needs of their virtual families and those whose production from paddy fields was insufficient to cover their needs. Among the first group, rice fields were used to feed the family and produce some surplus, part of which was then invested in a buffalo, while the remainder was either loaned or stored. Among the players who did not have enough paddy fields to cover their needs, we distinguished 2 main strategies:

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FIGURE 3 Players discuss the livelihood strategies they developed during the game and compare them with the reality of their daily lives. (Photo by Jean-Christophe Castella)

Some players who had a relatively abundant labor force compared to their area of paddy fields allocated sufficient labor force to upland rice cultivation in order to meet their needs, while surplus labor force was allocated to cash crops.

Other players adopted a "borrowing strategy," for a variety of reasons. Some of them really had no choice, because even if they allocated all their labor force to upland rice, they could not cover the needs of their family. Others had to make hard calculations about the future benefits of cash crops.

An opportunity to introduce innovation

The experiment of conducting role play in Bac Kan province was very convincing, both for participants and researchers. Participants found it useful to simulate real life in the role play framework, as it gave them a synthetic view of the system as well as insight into the difficult conditions some families face, sometimes with no chance for improvement.

For researchers, the primary result was the conclusion that such role play works, in the sense that players accepted it very seriously, trying to manage their virtual economy and do their best. Furthermore, at the end of the role play, researchers and farmers had a real discussion about what happened, which could be seen as a model constructed with or even by the farmers. The exercise was a helpful tool for facilitating communication between researchers and farmers.

Even if the participants felt a little confused at the beginning, they rapidly became engrossed in the role play and became very serious about the actions they had to perform. Moreover, they recognized similarities between the role play and reality in their own village. We found similarities and real continuity between field studies previously conducted in the same commune, the SAMBA multi-agent model derived from these studies, and observations during the role play. This gave us a good incentive to develop this approach further, combining multi-agent simulation and role play. The methodology has been refined to integrate role play throughout the entire research process. We have thus shown that role play can be used both to gather information from local stakeholders and to introduce technical and organizational innovation in a participatory way.

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Hoang Lan Anh is a social scientist with a special interest in the analysis of social networks in rural areas. She is working in the Mountain Agrarian Systems Program in Bac Kan province. She completed an MSc study with the School of Development Studies, University of East Anglia (UK), on social networks and farmers' access to information in rural Vietnam.

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