**Prek ComMod workshop; 4-6 December 2018, Cambodia**

These notes are partial and do not aim at describing the different working sessions that took place over two days in detail but rather at highlighting key features/findings that relate to (1) broader themes that may be interesting to investigate academically; (2) identifying possible future use and evolution of the tools we have developed so they can be useful to inform future investment and building capacity activities in the Prek area.[1]

***Day 1. Assessing farmers practices and highlighting the need for integration***

The initial idea was to have two groups (one with farmers from Prek Yey Hai and one from Prek Kampong Sambour) play in parallel on two boards in a first "game session" for participants to get familiar with the mechanics of the game. Once this would have been done, the facilitator would have represented the construction of a gate in Prek Yey Hay (as can be observed in the field) and the second session of the game would have then be played in plenary around the two boards brought together to illustrate (1) the need to think infrastructure development at the level of the landscape (e.g. integration) and (2) collectively identify what type of infrastructure could be built and why.

- The first game session unfolded very fast in the group facilitated by JP Venot (Prek Yey Hay)[2] and to avoid routine, after a few rounds, the construction of the gate was materialized and its impact in case of low and high floods modeled. A few interesting things emerged during the different sessions of the game : (1) at first many players placed their token on the chamkar (at one point there were 5 token on the highest plot of intermediary chamkar before we asked them to re-position their token…); (2) players did not want to place any token in the boeung (apart from the fact that the rules of the game had not been presented well enough, this was due to the fact that some of the participants actually did not have any plots in the boeung –but only Chamkar land; (3) round after round, the landscape quickly transformed from diverse cropping system to a landscape dominated by trees (see picture below);[3] (4) after one or two rounds, some farmers decided not to cultivate in the boeung almost "naturally" ; (5) most farmers wanted to "split" their chamkar parcel, with the area closest to the prek planted with trees and area closest to the drain planted with vegetables – this also fits the actual landscape of the prek and farmers explained that the Chamkar in part of Prek Yey Hay was low contrary to Kabong Sambour where it is "flat and high".
- A plenary ensued whereby we ask one person of each group to describe the dynamics of the game in each group [I am not sure if themes emerged during this presentation; see notes of ISC] and then we organized a round table whereby we asked what

[1] Notes are also partial because I did not participate to all the sessions. Apart from observing the plenary sessions, I facilitated/observed the game played by farmers from Prek Yey Hay on Day 1 and the game sessions on day 2 (not the scenario/narrative building exercises that were facilitate by William's Daré & Etienne Delay)

[2] We had underestimated the need to train the young ISC staff to facilitate the game session autonomously and JP Venot together with Sopheak Seng from ISC did most of the facilitation

[3] This also corresponds to the actual landscape of the Prek we followed after the workshop whereby farmers have planted fruit trees (and notably mangoes) as far as possible, including in the Boeung.

participants considered as positive and negative consequences of the construction of a gate. The list echoes reasonably well how the gates are presented/justified by engineers and what has happened in the field following their construction. The most often listed benefits are: (1) delaying floods and (2) storing water in the prek canal for Chamkar cultivation while the most listed negative impacts are: (1) land collapse and (2) blocking navigation. Several participants mentioned that there was a need to build gates on every preks so that they will be useful.

- Seeing that the idea of interconnection through the boeung and the stream network was something that participants had very much in mind, we tried to initiate a discussion on what kind of intervention could be implemented not on one prek but on the two preks "taken together". Interestingly, the discussion did not take off and participants 'refused' to put themselves in a position where they would propose what could be done at landscape level – saying that this was the role of the technicians not theirs and insisting, however that they knew what needed to/could be done in their respective village (the village chief of Svay Ta Mek was particularly vocal in the session)

*The attentive chief of Svay Ta Mek, explaining that they can be asked what to do in their village but that it is up to the technicians/experts to propose things at landscape level [who is the guy on the right of the picture?]*

- In line of the plenary discussion before lunch, we decided to continue working in separate groups and, this time, rather than replaying the game, we asked participants to identify what kind of intervention they deemed needed in their respective village (the

aggregated result can be seen in the picture below; the exercise was tantamount to participatory mapping). Farmers in Prek Yey Hay considered that there was a need to (1) reinforce the gate and the first sections of the road (reflecting the fact that these pieces of infrastructures have indeed been damaged due to the 2017 and 2018 floods) and (2) to improve drainage in two specific places (see red wooden stick below) and (3) install a pumping station at the level of Prek Ambel to either drain of pump water from it during the dry season [to be checked]. In the other group,[4] farmers propose to (1) build a gate (not sure if gate with pumping station or without); (2) rehabilitate the road; (3) build bridges across the prek and a production collection point (long stickers and white squared pieces of wood and (4) built a gate downstream of the prek at the junction with Prek Ambel. **Again, the discussion and the technical options identified by farmers translated an in-depth knowledge of their environment.**

*The boards at the end of Day 1, showing the desirable infrastructure development in Prek Yey Hay and Prek Ta Dong area*

NB1. The fact that there is one sticker of crops on the right board (Prek Yey Hay) and several on the left board (Prek Kampong Sambour) does not reflect different intensity of cultivation but rather different facilitation and groups' dynamics during the first session of the game in the morning.

- Not clear what emerged during the last plenary/debrief [see ISC notes]

[4] Though we had presented the "left board" as representing Prek Kampong Sambour when introducing the tool [not sure this was reiterated during the game session; where did the people playing on the board come from??], in the afternoon session, players considered it was the Prek Ta Dong area (which is to be rehabilitated as part of batch 1 of the WAT4CAM project). This means that we created a "spatial inconsistency" when we brought the two separate boards together in the plenary (the red wooden stick representing drainage on the Prek Yey Hay board –right- are meant to drain water, south of Prek Yey Hay, in Prek Kampong Sambour but in that instance the left board represented Prek Ta Dong for the participants of the group.

***Day 2. Discussing different modalities of infrastructure/agricultural development***

The second day of the workshop was organized around parallel sessions, whereby we had envisioned having three groups working in parallel: (1) a donor group; (2) a provincial administration group and (3) a group of local representatives –district and commune. Due to limited participation (the representative of the PD Fishery only came at lunch time and the representative from AFD was the only representative from donors), we ended up forming two groups: (1) donor, sectoral provincial department and engineering company and (2) local representatives and researchers. The group of donors/provincial department was initially not meant to play the game but we took their reactions when we presented tools as indicating they would be interested in playing it. So we reorganize the day accordingly.

- In the morning, the first group (donors/provincial department) was asked "to propose a future" for the Prek area along two axes: 'water control' and agricultural 'specialization' (meant to represent a trajectory of agricultural development epitomized by the green revolution) and the practical forms it would take in the prek area.[5] They decided to elaborate a narrative centered on increasing water control and high agriculture specialization that would take the form of a polder. The choice of the polder was strongly supported by the representative of PDoWRAM[6] and did not seem to make consensus within the group, notably for cost reason & its negative impact on the sedimentation of the Boeung; see notes of the session for further information.

  > *Narrative:* A polder allows controlling water and offers the prospect of intensifying agriculture by shifting to double rice in the boeung area but this needs to be done over the whole area otherwise this displaces flood risks. *When further probing:* through proper management poldering can lead to rehabilitation of the boeung and better sedimentation dynamics than through natural dynamics.

- Nothing particularly striking came out during the "game session" organized in the morning with representatives from two communes, the Koh Thom district and a researcher from IRRI. The logic of the game was very well understood and the level of unhappiness spreads rather slowly due to "good dice throws" (late and small floods) for several rounds (see the game description). When "intervening" to decrease unhappiness, no real logic seemed to emerge (the players generally took token from the farmers located the closest to them, in the boeung; one player however focused on taking away token from the same pin over and over); the fact that some pins had more

[5] We identified these two axes during the preparation of the workshop and settled on it because we thought it would allow avoiding groups to all settled for a "consensual scenario" between two extreme scenarios (as is often the case in such prospective exercise). These axes are very much 'technical' and we had discussion about complementing them with axes that would be more 'social' in nature (for instance equity and/or collective action) but could not articulate these axes well enough for making use of them during the discussion.

[6] He had also voiced this was what was needed for the area when we visited PDoWRAM a few weeks earlier.

connection than others did not seem to play a role in the action of the players.[7] When the facilitator materialized an intervention of the government on the board, players expressed a preference for small gates and pumping station rather than big gates (likely due to the land loss and bank collapse that have been observed when preks have been dug deep and large gates built).

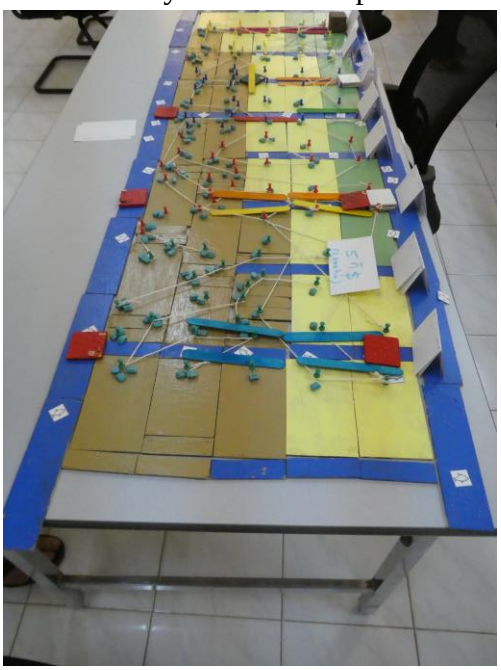
What appeared to be the most interesting in the morning session was the open discussion that took place in the plenary when the "administration group" came back to see the result of the game played by the local representatives and presented its plans for the area. The representative from PDoWRAM presented the plan – which was to make a polder. This triggered a very dynamic discussion whereby the local representatives (commune and district) did not seem to agree with such an idea on the ground that (1) it might lead to flood risks outside the polder; (2) decrease sedimentation in the boeung and (3) create differences in development levels [for more information, see notes of ISC].

- In the meanwhile, we [the project team] had prepared cards with 3 budgets ($2,5 Million; $3,75 Million and $5 Million); on the basis of the cost per hectare the "administration group" had evaluated a polder would cost (e.g. 2,500 USD/ha) (see below for further discussion on the amounts considered). The amounts were defined so only half the area represented in the game could be polderized if a player drew the $5 million card (assuming the inter-prek area was about 500 hectares).
- The PDoWRAM representative drew the US$5 Million card and, though it was the highest amount, he considered this to be a ridiculous amount not allowing implementing the plan he had in mind. When pressed to materialize where on the board the group would implement the polder, the PDoWRAM representative refused to do so and the discussion around the desirability of a polder re-emerged. After a short time, the representative of the district authority (who had signaled to one of the commune representatives to stop discussing with the PDoWRAM representative) took the material in his own hand and started materializing investments on the board game. He started by rehabilitating the preks where he had been playing earlier, then "invested" in the area of a neighboring player where no investment had been materialized during the morning game session, then completed existing investment, leading to a board where no polders could be seen – see right picture below)

[7] As a facilitator, I intervened twice significantly : (1) by stating that pins without connection who had more than 3 tokens could be left as such (despite the rule) because they came from Takeo and did not know anyone. It did not shock the players who laughed... (2) when saying that unhappiness spread without them being able to stop the spread, one player (representative of district) started asking from government intervention

The board after the morning game session on day 2 (investment materialized randomly by the facilitator – JP Venot)

The board after the morning plenary discussion on day 2 (investment materialized on the board by the district representative)



Following the discussion (and lunch) we decided to "invert" the groups: (1) the sectoral administration group would play the game with a polder (the representative from AFD left after lunch and was replaced by the representative of PD Fisheries) and (2) local representatives would flesh out their 'vision of the area' – the facilitator trying to push them to discuss other scenarios than a scenario of increased water control and increased agricultural specialization [did this work or did they focus in one corner of the graph too?].

- The open discussion of "the local representatives" led to an infrastructural development scenario strikingly different from that of a polder. It mostly consists in building gates on all Preks but those that connect Prek Ambel and the Bassac (and serve as transport routes) and at building a transversal canal at the limit of the Chamkar and the Boeung; a canal that would link all Preks (this somehow "mimic" the landscape of the floodplain located between the Bassac and the Mekong). One of the stated objectives/advantages of such infrastructure development, the district representative explained, would be to extend the area under double rice but also in other places to shift from rice to vegetables (where the water could be slowed down) (See below right picture and notes of the session for further information.

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| *Narrative:* There is a need for land use planning whereby areas would be devoted to specific crops according to the characteristics of the land (with a specific importance given to promoting vegetables and fruit trees). Infrastructure development should then support this view and take the form of a network of drainage canals covering the extent of the boeung, rather than a polder that may lead to focusing on a specific area at the expense of others. |

- The additional infrastructures that had been materialized by the representative of the district were taken away from the board and the group of sectoral representatives was first asked to materialize the polder they wanted to implement. The conversation quickly stalled as the PDoWRAM representative considered that USD5 Million was not enough to invest in a polder.[8] To get the group doing, the facilitator (JP Venot) (1) multiplied the budget by 10 and (2) said that a clock was ticking and if that people did not agree on where the polder should be built, the budget will be progressively decreased as the Ministry of Economy and Finance would partially reallocate the funds. Disillusioned, the representative from PDOWRAM withdrawn and the representative from the engineering company facilitate the work of the group. They decided to build a polder on the most northern part of Koh Thom district [not clear why they started there], going as far south as possible and in the process moving the infrastructure that had been materialized in the earlier game session "out of the polder area" if these infrastructure did not actually exist in the field [this, to me, reflects that they were playing with the field reality in mind rather than with the tool they used; see also last footnote below].[9] They also opted for gates (at the entrance of the Prek) equipped with pump systems.

- The idea was to play how the construction of a polder could affect both positively and negatively the level of unhappiness in the "playing area" and initiate a discussion on the spatial distribution of costs and benefits. We [the facilitator] were notably worried that the message people could "take home" was that building a polder was a "win win" situation across the board. We had planned to: (1) decrease unhappiness in the polder at each round of the game and (2) engineer a large scale flood that would damage some of the infrastructure with significant impacts inside the polder. We did not have time for this scenario to unfold but interestingly the representative from the engineering company started materializing an increase in unhappiness (1) on all tiles where infrastructure had been built (representing land loss) and (2) in case of low flow that required farmers in the polder to pump as well (in that case, unhappiness was linked to increased in production cost). This happened at the dismay of the PDoWRAM representative who signaled his opinion that such unhappiness was either irrelevant or ill-funded and that farmers should somehow "hack it up" given that they had benefitted from the construction of a polder.

| The infrastructure development scenario materialized by the sectoral ministry group | The infrastructure development scenario imagined by representatives of local authorities |
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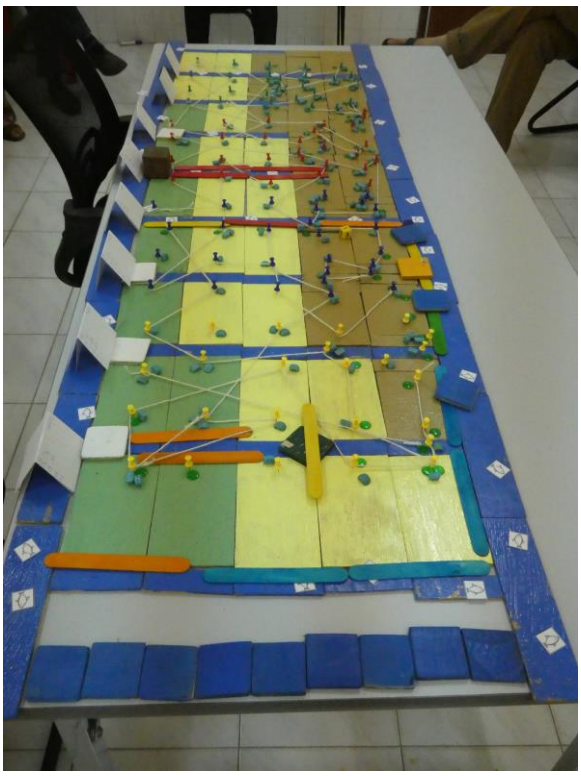
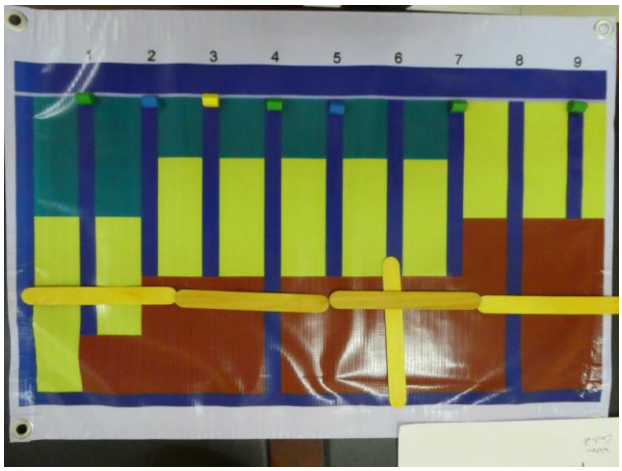
[8] And rightly so, at least on the scale that the PDoWRAM representative had envisioned (e.g. the entire Koh Thom district): under the WASP project, the rehabilitation of one prek cost about USD0,5 Million.

[9] When materializing the dikes they needed to build, they initially build one dyke in between two preks. When asked why this was the case, they said they did so because they did not have enough wooden stick to go all the way to the next prek while this is where the dyke should be built. We added a piece of wood to make it sound on an engineering point of view. The participants installed pumping station to drain the polders, where they deemed it was necessary to empty the polder (as in some places and times, the level of water would not allow for drainage by gravity). The materialization of the investment on the board game "made sense" from an engineering point of view and fit the knowledge/understanding of the field that players had.






- At the end of the day, we summarized the level of unhappiness by prek and compared the situation before lunch and after the construction of the polder (need picture of the white board or at least results). The comparative table allowed highlighting the point that the construction of a polder did not necessarily lead to decreased unhappiness, which allowed opening again a discussion on the desirability of a polder during the following plenary – which as had been the case in the morning quickly stalled.

In the plenary discussion that followed, the representative of the district presented the infrastructure development scenario they had developed [see narrative above]…. I'm not sure of what happened during that session [ISC notes needed].

- I seem to remember that the district representative mentioned that building a polder covering only one part of the district would be difficult to justify (socially speaking) as people not benefiting from it would likely complain and that such infrastructure development would likely trigger differential development; the people in the polder being able to intensify agriculture; the people outside not really.[10] [not sure this was in this session though or in the morning plenary]

***Overall conclusions and emerging themes***

I feel we designed a game that principally aimed at discussing different infrastructure development scenarios and at illustrating that infrastructure development needed to be seen in an integrated way over the entire "prek area" as building water control infrastructure (1) could

[10] Participants even joked about people in the polder having only two kids because they do not have time because of agricultural activities while people outside the polder will have three kids....

have impact beyond those anticipated in other parts of the landscape but also (2) that the primary purpose for which specific infrastructure are constructed could be hampered due to interconnections that had not been initially foreseen (this is how I had envisioned the tool).

Against this backdrop, the tool (combined with a prospective exercise) "worked very well" during the second day of the workshop. Different groups expressed different visions for the prek area in the future, which translated in different infrastructure development options (see detailed description above). The game is indeed a way to discuss infrastructure development scenarios (*scenario d'aménagement*) and can be used to illustrate the "infrastructural lock-in" that has characterized delta development over the last 150 years.

- Academically, one way to "push it forward" would be to make the question of (environmental) justice more explicit. The question of spatial and temporal equity and that of the distribution of costs and benefits related to the construction of different types of infrastructure could be particularly interesting. In terms of paper, and after having set the context and discussed the idea of justice, we could then use the game to illustrate different views of what is just/equitable or at least desirable – and why- for different groups of people (this would be a classic case study paper of the different visions different actors have of a delta floodplain). The example of the polder epitomizes this: building such infrastructure can allow intensification in one area, which can be seen as desirable for some actors but can also lead to a "2 speed development", which other actors may not find desirable.

  ➔ *What does this means for the tool? What changes/addition are needed?*

- Another academic entry point is that of the "commons" and their evolution. In relation to this, the game can then be used to illustrate a dilemma between two development pathways: (1) intensification, individualization and specialization of the landscape with short term economic gains (for some) *versus* (2) the preservation of multiple use/right systems that centers on the boeung (but that might come at the cost of lower immediate economic returns) (see the paper by Feuer on this duality also characterizing the agricultural sector in Cambodia). This can be linked to the sentence coined by Etienne Delay: *"it is about transforming uncertainty into risk"*®. The specialization of the landscape through the means of infrastructure development leads to "engineering risk" (security in normal years but high losses under extreme scenario progressively leading to an infrastructural lock-in) while the preservation of multiple use/right system consists in mainstreaming uncertainty (and spreading risks…).[11] To address this "dilemma of the commons" the tool would notably need to:

  ➔ Better account for the multiple use of the Boeung and the ecosystem (notably fishery that we had planned to include but totally ignored)

[11] This can notably be linked to collective action dynamics whereby Khmer farmers used to engage in collective construction of small dykes across preks to slow down the flood so that they could harvest (see notes of the discussion + diagnostic report of 1995) and to the fact that, as time goes by, less and less people have an interest to do so as their land becomes Chamkar land (protected from floods) due to sedimentation.

- Finally, a third academic entry point is the notion of *boundary object*. As clearly emerged from the multiple discussions I have had over the last 2 years, the game illustrated that the Prek (and even more specifically the gate of the Prek) act as a true *boundary object*. Despite its "hard nature" (e.g. it is an infrastructure), and maybe because of the complexity of the landscape in which it is embedded (boeung/chamkar; changing river flows; multiple uses at multiple times of the year), different people attribute different purposes to the prek/gate and specific individual attributes different features/purposes to the prek/gate – some of which can even be contradictory. Rather than "undermining" the idea of prek rehabilitation; such contradictions allow for the idea of rehabilitation to stick (interpretative flexibility). This is more of a theoretical argument and I'm not sure the participatory work can be used to illustrate this point.

In contrast with the second day, the tool "did not worked very well" during the first day of the workshop. We had planned the participatory session so that the need for thinking infrastructure development in an integrated way across the landscape would come to the fore at the end of the day. We had assumed that people from a given village/prek were not aware that their area was connected to and affected by what happened in a neighboring village/prek. We were quickly proven wrong when, very early in the discussion, some participants clearly flagged that building a gate on one prek to protect the boeung from floods was meaningless as the boeung received water from different places. To be meaningfully used with local actors the tool hence should be modified significantly -including the scale that is represented in the tool. I see two main options with two main objectives and potential end users:

- **The first option is to focus on already rehabilitated preks** and to develop a tool that would aim at defining management rules/responsibilities of existing infrastructures *(for instance, we have not yet clarified who takes the decision to open and close the existing gates)* and their maintenance modalities (the latter being a likely medium term concern). This tool could be used to support the establishment and the strengthening of PUC, currently coordinated by ISC. **In this scenario, ISC is both designing the tool (together with CIRAD, IRD and RUA) and its end-user.** For the tool to be used meaningfully, this will require specific training session with ISC staff so they can be autonomous in using it. Few elements of the current game/tool can be re-used
- **The second option is to focus on the preks that will be rehabilitated as part of the WAT4CAM project within the next two years.** In that case, and given the in-depth knowledge that the local population has of its environment and of the inter-connections through water, the idea would be to have a tool that allows testing the (1) desirability of different types of infrastructures and (2) their foreseen positive and negative impacts on different parts of the landscape. In this scenario, the end user of the tool is the technical assistance team that will support MoWRAM implementing the WAT4CAM-Prek project and PDoWRAM/MoWRAM itself. We can elaborate on the current game but need to (1) identify a wider set of infrastructure options and (1) attributes specific features to each of them according to key indicators/criteria that are of importance for the local population for instance: (1) land loss implication; (2)

maintenance cost; (3) impact on fishery potential and other uses of the boeung; (4) capacity to control water flows; (5) impact on transport; etc…

- **A third option, which relates less to water and uncertainty, is to develop a tool that will delve into the details of cultural practices and decision making** and how these may be affected by the rehabilitation of preks and sedimentation. This is less in line with the DOUBT project objectives.

***On the tool***

- The tools developed are rather mechanistic and can be relatively easily computerized to test the long term impacts of different infrastructure development paths and agricultural practices and that according to different hydrological scenarios (that can easily be realistic based on the data we have on the Bassac river water level). Do we want to go that way and to so what? We could use such computerized tools to test hypothesis on the distribution of costs and benefits of different pathways (or their justice dimension) but results will depend on the model calibration… To make it meaningful, the specific studies and game sessions we implement in 2019 should then have for objective to highlight what people think are the costs and benefits of different interventions and to rank these. It becomes an exercise of analyzing "perceived futures" and how these vary according to stakeholder groups…
- There is a tension between our willingness to develop a tool that is "abstract" enough so it can be used generically in different places (e.g. preks/villages) hence allowing to infer broader lessons (but I am not yet clear what would be the questions that we would ask the tool to answer: what hypothesis do we want to test through a wide use of the tool?) and the way participants related to the tools. Despite our efforts to abstraction, all participants asked for clarification about which preks were represented and only after this had been clarified were they able to play (this clearly illustrates the fact that the tool worked as a boundary object but also can prove interesting to discuss how participants relate to the game and how they link it to the field reality).[12]
- In relation to the above point, maybe do we need to think of a tool that is even more open that what we have now, asking people to define their own landscape on the basis of the color tiles we have defined (green, yellow, brown). This is likely to have little impact on the main perspective flagged above.
- Brown tiles were meant to represent the boeung and we considered the tiles were flooded every year. Participants seem to identify two types of boeung: one that is indeed flooded every year, the other that may or may not be flooded.

[12] This for example was shown when presenting the game in the morning of the second day when participants started naming the 4 communes of Koh Thom district when we explained that the different colors of the pins represented different communes (luckily, we had 4 colors for the 4 communes of the district!). This also emerged in the game session of the afternoon of the second day when the group decided to build a polder starting from the most northern prek in Koh Thom district and named the subsequent preks one after another, in the process replacing the elements of the game that had been placed in the morning to fit to what existed in the field reality. The difficulty to relate to the abstract support of the game was also reflected during the last plenary session of Day 1, when the different groups were asked to put together their respective board

- An easy addition would be to attribute (investments and possibly maintenance) "costs" to each element materializing investment (which has not been done during this first workshop); we then need to conceptualize forward the impact of these elements on different aspects of the landscape that we deem important to consider.
- We had initially envisioned representing the dynamics of sedimentation (which would have allowed discussing long term changes in cropping patterns but also the changing spatial distribution of risks in relation to farmers' strategies). We ended up not representing it during the game session; maybe is it something we need to 're-introduce' as sedimentation dynamics seemed to be of importance for farmers (this clearly emerged during the discussion of Day 2).

**Appendix: Some pictures of the workshop**

*Participants to the first day of the workshop (Kampong Sambour pagoda)*

*Participants to the second day of the workshop (Royal University of Agriculture, Phnom Penh)*

*Group session game (Day 1; Prek Yey Hay)*

*Plenary discussion of Day 1*

*Presentation of the morning game session in day 2*

*Planning infrastructure development (provincial department, donors and engineers group)*