



# **Working in Complex Systems: The Rubber Value Chain in Indonesia**

## **Presentation Transcript**

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*Moderator:*

Well, good morning everyone and thank you for joining us for the 68th Breakfast Seminar. It's good to see you all. We are recording the presentation. That's the reason for the mics – not for volume, and it will be available shortly on Microlinks. The link is over here: [microlinks.kdid.org/breakfast](http://microlinks.kdid.org/breakfast). We do have a communications team that's tweeting live; they're out in the other room. You can follow us here, #mlevents, if you feel like tweeting as well. With that, I would like to introduce Dr. Jeanne Downing.

*Female:*

Good morning everybody. I'm really happy to have Frank Page and Donna Read here today to talk about a topic that is kind of a new topic in our agency, and \_\_\_\_\_ is here from USAID, and he's actually been part of a group within AID that's been talking about systems and complexity. I think we also, in terms of value chains, have been thinking increasingly about value chains as market systems, and there's been a real question of: how do you think about systems? How do you use systems thinking to do analysis, to do intervention design, to think about interventions? So, I'm really pleased to have some experts here to talk about systems and complex systems, and to link the thinking of complex systems to value chain development. So, with that, I'll turn it over to our speakers.

*Female:*

Thank you very much. My name is Donna Read. I am with Managing Systems for Wellness, and with the Waltersdorf Group. I have worked with the founder of Human Systems Dynamics quite a bit, and my task today is to try and simply explain in 15 minutes or fewer, what human systems dynamics actually means. So, human system – when we talk about human systems dynamics, we are talking about a way of primarily making sense of patterns. As humans, patterns are what we do. We make patterns, we see patterns, we break patterns, we move with patterns. We talk about them as similarities and differences in relationships that have meaning across space and time. When we look at human systems dynamics, we're looking at a model which is a meta-model for change. It works with emerging systems. It works in what we call the zone of complexity, and it's important for us at this point and time because we are constantly dealing with change. Change is what we deal with; nothing is fixed and stable anymore. So, as a model, if we're looking at systems theory, we might want to use Senge, who would work with systems archetypes. Or, we might want to work with Lewin and freeze, unfreeze, refreeze. But, when we're really looking at a zone where everything is constantly, constantly changing, we can't do that. And that's not to say that those models are not correct; they're appropriate and have their uses, but this moves in a different zone.

HSD is based on the study of complexity science and chaos theory. It focuses on the surprising behavior of what's called a complex adaptive system. HSD in action means that you can see patterns as they emerge; you can find the difference that makes the difference, and find the fix that fits the situation. When we talk about complex adaptive systems, we're talking about a self-organizing system, and we're talking about a collection of individual agents. These agents don't need to be people; they can be ideas, they can be associations, they can be departments, and they can also be individual people. They are anything that can interact with anything else and create change. These agents have the freedom to act, so we refer to them as semi-autonomous, and they can act in unpredictable ways, and their actions are interconnected so that they produce system wide patterns. As we see here, with the agents coming together, they are all interconnected. Agents interact with each other, and as they interact, they create the patterns. Out of those patterns, we get – where is it, there – we have systems wide patterns that emerge. These system wide patterns form the activity that's happening within our systems. But, because you have semi-autonomous agents in there, patterns are going to change. So, something may be working at one point, and then something shifts. And as more agents come into that change, then that pattern is broken, new behaviors emerge, and then a new pattern emerges from that. That's constantly happening. There are three key principles of behavior in a complex adaptive system, and those are: that it's not hierarchical at all – it's emerging, its history is immovable – it's fixed, and its future is unchangeable and it's uncertain – we don't know what's going to happen.

As change agents, we come in, and we look at the behaviors, and the patterns in an organization. So, we observe, and we decide on what intervention is the most appropriate, and we act on it. We will come in, and we will find the easiest point of entry. We will try one intervention, step back and observe what happens, and monitor and evaluate that. As we become familiar with the process happening in the system, we will go back and try different interventions. The thing about these systems is that you cannot control them; you can only influence them. So, we look at leverage points of influence. We go in, and we look at the patterns, we learn from the system and its patterns, we design changes, we manage the change, we resolve any conflicts that are in the environment, we evaluate the performance of the changes, and we adapt them. That's our role as change agents in a system.

One of the tools that we use is called the landscape diagram. The landscape diagram operates on two continuum. On the horizontal axis it's certainty, on the vertical axis it's agreement, and you'll notice that in both of them, down in the lower left hand corner you have close to, and at the far ends, you have far from. So, close to agreement, far from agreement, close to certainty, far from certainty. Down on the lower left hand corner

of the landscape diagram, we have what we call the stable zone, and this zone is very fixed. We know what's going to happen; there are few variables in there, and a good example is to think payroll. You know if you get your timesheet in on time, chances are you're going to get your paycheck. Nothing in that is going to move. So, everybody agrees on that, and everybody's pretty certain about it. Then, up in the upper right hand corner, we have the area that we call unstable. That's the area that seeks patterns. It's looking for a way to form itself. It's looking for a way to emerge. It's an area that is uncontained. So, in moving and working with this, we're seeking what we call the area of emergence. The area of emergence is the area where you're seeing constant change. This is where we can influence. We try and influence behaviors, we try and influence patterns in the system. It cannot be hierarchical, it cannot be ordered. It can only be moved by influence. So, it's very important to be really intuitive in this area.

There are three conditions that as change agents we use in this system. They're containers, differences, and exchanges. A container is anything that holds a group of agents together. So, it can be your policies and procedures, for instance, or it can be the boundaries of your system. It can even be an idea. That's one of the places that we generally enter into the system to influence first. It's often the easiest. We look for what we call significant difference in there. Significant differences show us what the patterns are, and they show us where we can break the patterns. So, when we first come in, we may find many differences depending on which part of the landscape diagram we're in. We will pick the ones that are the most important. We also use what we call transforming exchanges. Transforming exchanges are simply communications between the agents. And again, that can be anything. It can be information. It can be money. It can be anything that moves between one agent and another.

Now, I guess I can turn this over to Mr. Page, who will apply the theory.

*Male:*

My name is Frank Page. I'm also a member of the Waltersdorf Group, and for 17 years, I was in an independent consultant and facilitator in Indonesia where I did some work on a value chain facilitating value chain change in Borneo. When I learned the HSD model, I thought it was very applicable to the work we had done in Indonesia. This is the section where we want to apply HSD to a value chain. This is a quite simple value chain of rubber in Kalimantan. The basic value chain – and this is what we call patterns, an HSD system – these are the patterns that have emerged from a self-organizing system. Starting with – we have the input suppliers, key inputs for the system are coagulants to process the rubber at the farm level, and agricultural products which are not reused too much, but fertilizers, insecticides, and seedlings to replace rubber trees. Small holder rubber farmers have a couple of hectares; they tend to own their

own land in the area. They sell their rubber to either village collectors or regional collectors. The village collectors are their neighbors, and also tend to be rubber farmers themselves. These collectors then sell the raw rubber to approximately 11 factories in the region. The factories are not in direct competition, but they do not collude to set prices. They set their pricing based on their needs. So, if they need rubber, they will raise prices to attract – if they have enough, they will lower prices. They are held together by a national rubber association, which is there to protect their interest.

The rubber they export goes through an exporter to rubber manufacturers – mostly tire manufacturers like Goodyear. Key aspects in the enabling environment, I think is the correct term, is some government policies which the factory and the national association of rubber where of regarding farm gate prices – I'll talk a bit about more of that in a seconds, regulations on the quality of rubber that can be bought or sold, and also regulations on creating farmers groups that sell directly to factories. There is a government extension agency in the area, in the district, but that seldom reaches down to the farmers we're dealing with here. One other crosscutting providers are cell phones; cell phones and texting is prevalent throughout the area. In terms of finances, the rubber factories are connected to the banking system. As you move down the chain, it's more informal, and farmers tend to get loans from the collectors based on future sales. So, that's a brief description of the value chain.

As the analysis came up with, some of the key constraints: the pricing mechanism promoted low quality rubber. This was due to the fact that pricing was based on weight and reputation of the region. The farmers in this region had a bad reputation, so they would actually receive lower prices than other farmers from different regions, but pricing was all based on weight. So, the incentive there is to have high moisture rubber – the wetter, the better, 'cause it's heavier, and/or to the point of adding contaminants so that you get better weight. Let's see, the farmers were not aware really how prices were set. They accepted what the traders were offering. Part of the issue here is that traders were not willing to wait the three to four hours it took for the factories to test weight. The factories were willing to test moisture content, but the traders really didn't want to wait that long. They'd rather take the prices offered based on weight and quality, and get back to work. There was no technology to measure moisture content in the field.

Another issue is coagulant. The recommended coagulant for high quality rubber was not readily available in the field, though it was available in regional cities. The farming system – the farmers produced rubber mainly for daily income. The idea was they could sell their rubber daily, collect money for their daily needs. It was not a highly commercialized activity

for the farmers. Due to the pricing system, the farm gave prices were lower than government regulations allowed. There was a lot of trade in low quality rubber which actually was against government regulations. However, factories would accept it because they needed rubber to fulfill their quotas. One reason for the lower prices was: that covered their costs of processing this low quality rubber. Those were the key issues that we identified in the system at this level.

So, if we take the HSD approach, some of the key – some of the differences we identified were: factories wanting good quality rubber, farmers wanting higher prices were very normal for such a system. Pricing was not transparent, and there was confusion about how prices were set. There were different perceptions among the farmers, collectors, and factories regarding the market chain. There were different levels of knowledge for government regulations. As we came together to discuss this, the key differences that would leverage change were the top two, which I've marked in red. The factories wanting good quality rubber, and farmers wanting higher incomes. As we came together to look at the market chain, these were the two issues that people were excited and interested in discussing and working on.

If we look at the exchanges, I've mapped out not all of the possible exchanges, but many of them, starting with the small holders, and their local exchanges, looking at how they're connected to community leaders, religious and traditional leaders, their own families, local input providers, village and sub district governments, there are NGOs in the area working with the villages, and their connections with the rubber collectors and river traders. As we move up the chain, the rubber collectors are very similar to the small holders as they're a part of the community. But, and we move up the chain further to the rubber factories, we see they have a different set of connections. They're located in regional cities, have connections with the rubber association, universities, higher levels of government, and also the sellers of input in the cities. As you can see from this diagram, there is a very low connection, or a low exchange between the rubber factories and rubber farmers, which is common in a lot of market chains. So, our first stop at working on the market chain was to make a connection, try to create a new connection, a new exchange between rubber – the rubber factories and the rubber farmers. The second important aspect was to create a new exchange – whoops, I went the wrong way – between input providers in the regional cities, and the farmers, particularly to get the recommended coagulant down into the farmers.

Then we move on to looking at what we call containers. Containers are anything that can hold a group of people together. I've listed out a number of containers in this system, starting with the international rubber manufacturers, the factory owners, rubber collectors, rubber farmers. The

livelihood and farming systems is also a container. That helps farmers make decisions on how they're going to use their resources. The technology available is also a container, 'cause again, this controls and puts people – to controls how people can and what they can do. Social and cultural norms also influence decision-making. This is also a container. So then, we go back to the other community, and religious, and traditional leaders are their own container; government policy also controls the systems, so they're a container. Government research and extension is another container. The river traders, the financial institutions, and NGOs. They can all be considered containers. We chose to bring together the containers in green: the factory owners, the collectors, the rubber farmers, bringing technology on how to improve the processing of rubber at the farm level, government policies, and government research. We did this by creating a new container which was a three day workshop made up of all of these actors: the rubber farmers, the village collectors, the owners, the government agents, and research agents from the universities. We held a three day workshop, and that in a sense creates a new container. The focus of that workshop was addressing the two key differences: how can this group work together to improve prices for the farmers – incomes for the farmers, and get quality rubber to the factories? And in the process of this, we strengthened and deepened exchanges, particularly between the rubber factories and the farmers. We continued this process going in continuing training and workshops. So, after the original workshop where we plan a variety of trainings, each trainings were attended by farmers, and also factory owners to continue deepening that exchange and creating that relationship. The result of this facilitative process was a series of trainings, as I said, to improve rubber quality at the farm gate, and ensuring that the connections between the farmers local, collectors who became transporters. They joined the farmers and become transporters so that sales were not made directly between the farmers and the factories. But, we wanted to continue making those exchanges, and reinforcing those relationships.

This developed – started as a pilot project to see if the agreement would hold. And one of the issues was as you dry rubber to make it high quality, you lose weight, so of course the farmers wanted to see whether the pricing system, based on government regulations, given good quality rubber, would actually earn them money. The result of those tests were that while they were receiving twice as much per weight – for their rubber, they did gain 20 percent in income. So, so far, these connections held. I left the project at the beginning of this process; I actually did a quick visit last month. These connections have held, but new issues are arising, partially because of the volatility of rubber prices in the international market. Farmers will stop selling when their prices get too low, 'cause it doesn't make enough for their daily incomes. But, so that's – as Donna said, as you go through these systems, you do one step at a time. So, as

we worked on one intervention, we've seen what happened, and now would be time to work on a second intervention to continue working with that.

And so, that is briefly in about ten minutes, of trying to take this meta-model that HSD has, and apply it to a value chain. So, many of the work – traditional work or current work on value chains fits the model. There's an overlap. But, we also hope that if models that are working with value chains come to an edge and are not working, this meta-model helps begin to look for different ways to influence the system as if and when the traditional models, or the models in use do not begin to get the results you want. It gives you an expanded way to begin to look at the system. To close, Donna?

*Female:*

So, I was just asked to mention the tools that we use in human systems dynamics, and I'm not going to go into any great detail because it would take more time than we have. One of the tools that we use are butterfly effects, and we use those to track communication within a system, and also to influence communication. So, if you want to maybe direct it in a certain way, you would release what we call positive butterflies, but you would also keep your ear to the ground to listen for negative butterflies, which will tell you what the currents are. When you find negative butterflies, you want to immediately counteract them with positive butterflies. We look for the boundaries of the system, and we worked with those boundaries. We used transforming feedback loops. We use fractals, and in this sense, an example of the fractals would be within a system, or I guess an organization would work better for this example, is your mission or your vision statement. You want that to be reflected in all parts of your organization, at all times. So, it's really the DNA of the system, or the group. We use attractors, which are points that draw the system together. We work with self-organization, and we look at coupling – what agents in the system are working together, are coupled together. Sometimes in a system you may have parts that are uncoupled and you don't want that, which will result in having agents feel like they're left on the outside. So, you want everything to be tight. Sometimes you want to uncouple things, so we work with those, and those are the basic – what \_\_\_\_\_ calls the seven simple tools. But, they get to be more complicated in their application. So, thank you very much.

*Male:*

Thank you.