The Chaos Theory Applied to International Co-operation

(A Proposal to Go Beyond the Linear Logic)

by Javier Schunk[1]

Let's de-structure our schemes

Clouds aren't spheres, mountains aren't cones… (Benoit Mandelbrot)

Projecting comes from Latin "proiectare", which means to throw on forward. This concept implies the capacity to foresee and control the future.

C.S. Gray, in his book *Strategic sense, strategic non sense proposes the "paradox of prevision", pointing out that "the more useful a prevision is the more precise it is, but the probability that it may be wrong increases according to the degree of precision of the hypothesis, which makes it not only useless but also dangerous […]"*

„Do you know what the second article of our constitution says? We must do it ourselves !!!" (African joke).

We need to consider that not only is it difficult to foresee and control the predictable, but it is even more difficult to predict and control the unpredictable…

B. J. Lecomte, in his book *L'aiuto progettuale points out that making projects " implies a view on the future, not in order to predict it, because it is impossible, but to invent it"*. In other words, projecting means inventing one reality and then operating in order to make it true. That is, creating an order!

In the field of international cooperation, we need to invent a reality, or to create an order, in a context we do not belong to and therefore we do not know very well. If we also add that contexts change continuously, things become quite complex for those who carry out actions of international co-operation.

Yet, it is not enough to invent a future reality. We also need to learn how to read the natural irregularity of things. To learn the laws of nature where stability and instability live together in an harmonious and dynamic balance. In nature beauty is composed by order and disorder living together.

We live in times of unpredictable events, of huge and continuous changes. The myth of man capable of full control over processes, has collapsed. Financial markets, wars, climate,….we live in a chaotic world that seems to be steered by the unpredictable. A world made of chaos in which we must learn how to live *adapting ourselves* and *reacting* at the same time. To achieve this aim, we need to be prepared to project in a different way….

A new way of planning will require a particular mental effort and, above all, a cultural sacrifice, because as James Gleick said, *"in our civilisation, we have a natural inclination to search for order in things because disorder has a bad reputation"*.

In the above-mentioned quotation, Mandelbrot pointed out with a simple and deep sentence, that the Euclidean geometry, on which the Western culture is based, is not absolute reality, but rather "our" model to represent it. Western philosophy was forged according to this misunderstanding and, more generally "our" Western culture is based on "models" of interpretation of reality which present three kinds of problems: they are "linear", unreal and not universal.

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What has just been said tries to stimulate us towards *de-structuring* our way of thinking as the main step for the comprehension and interaction with complex systems, such as the contexts in which projects are carried out.

One of the main postulates of this action is that we have to be aware and humble enough to recognise that in reality the outside stakeholders of a project are the "co-pilots" and not the pilots of a process. We should learn to travel in a different way in the "car" of international cooperation, accepting to be passengers who sit next to the driver and who, realising where he is going, suggest him from time to time short cuts or changes out of schedule… Projects are, actually, "deviations out of schedule" from the natural course of things.

In the following pages we propose a suggestion on the way to ***project in the Chaos.***

The "classic" concept of quality

The concept of quality is usually associated to the production of the results we expect and therefore to concepts such as efficacy and efficiency. Let's analyse the first of them.

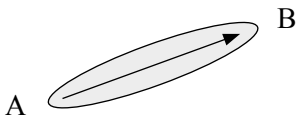
Efficacy

A project must predict the effects it can achieve through the formulation of "objectives". In terms of evaluation, efficacy is the relation between the achieved objectives – that can be seen, tested and measured – and the theoretical ones.

$$\text{Efficacy} = \frac{\text{Achieved objectives}}{\text{Theoretical objectives}}$$

The bigger the upper factor, the bigger the efficacy of the project.

In the same way, efficacy can be evaluated in terms of results and activities.
The concept of efficacy can be found in the first and in the second column of the logical framework (vertical logic and indicators respectively).
This system of evaluation is peculiar to the so called "classic" strategic school whose thought can be represented by the following drawing, as a path going from A to B:



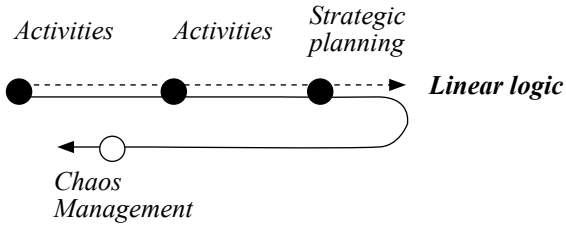
This kind of planning is based on the long-term rational analysis that was popular in the '60s. This strategic school uses the ***linear logic*** or Cartesian logic, according to which a past event *(cause)* has consequences in the present *(effect)*. In this case the following order is respected: past ➜ present; cause ➜ effect. Our Western culture is based on this way of thinking. The ZOPP methodology proposes, for example, the tree-like representation of problems and objectives employing the same technique or type of logic. Nevertheless, this type of logic shows its limits and must be reviewed.

As a matter of fact, it is a simplistic model to interpret a reality, but is very complex to put to practice. For example, a good *tree-like representation of problems* is given by the spider's web where some effects feedback their causes by way of a circular logic according to which it is often difficult to understand what was created first, the chicken or the egg!

This kind of logic not only influences the individual projects but it has also characterised the whole story of international cooperation, which has also followed a linear path.

The evolution of project planning

In the field of international co-operation, making ***activities*** was abandoned in favour of thinking by ***objectives*** and by ***strategic planning*** (logical link between objectives). This path was followed by means of a linear logic. Today, with contexts changing continuously, this type of logic should be substituted by ***Chaos management***.



When problem solving was translated into the realisation of activities, the reaction-time was quick and activities were decided and carried out in a short time. In this way actions were relevant but airy and short-sighted (the *time-horizon* was limited to "today"). The risk lay in doing things without concern for whether the action might later still be valid in a changing context. Once it took more time to approve a project, and the decision making technique consisted in thinking by objectives, then activities were more logical. They were placed in a wider *time-horizon*. But the time of reaction became longer and consequently there was a major risk of lacking relevance. With the introduction of strategic planning, activities are now projected in future times. On the other hand, the time of reaction has increased and the "machine" has become even less flexible and inadequate.

As described in the graph above, we should go back to short times of reaction through simple and efficient activities that follow the changing contexts and continuously push it toward new and better conditions of dynamic balance. Projecting in the Chaos means just that.

Towards "non linear" projecting

We would like to take a new look at the concept of quality that is linked to efficacy and so to the use of the linear logic and the classic strategic school.

Projecting in Chaos implies leaving this type of logic and to employ non linear logics such as, for example: the ***circular thinking*** according to which one event, that has not happened yet (future), produces an effect in the present and this effect will help the event come true in the future. In this case, it is the future that determines the present; or the ***lateral thinking***, which, as opposed to the linear one that searches the truth in a selective way, thinks in terms of "possibilities", that is to say in generative terms. The method is based on the *exploration of multi-possibilities,* even though they seem to be illogic, instead of using just the most logical one.

Let us now look at the interaction between an external action and the context.

The reaction time for external aid

The IDA three-step: *(inspired by "War, strategy and security" by Carlo Jean)*

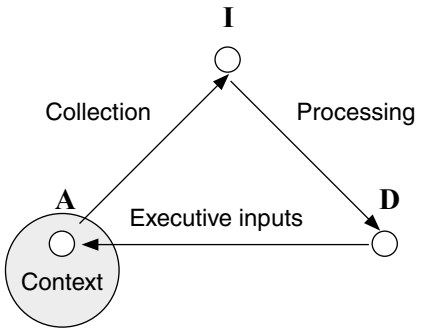
Any ***action*** is preceded by a ***decision***, and this decision is preceded by the collection and processing of necessary ***information***.

The "capacity to react" depends on the speed of information management and on the time needed to translate it into executive inputs. In other words, it depends on the speed necessary to manage the *IDA* three-step (information – decision – action).

To guarantee maximal efficacy in decision, information must be proportional to our capacity to react and hence to act.

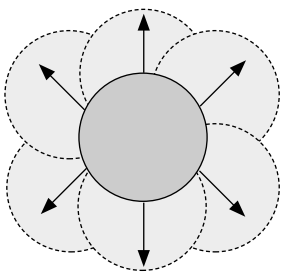
The longer the time needed to process information, the lower the reaction speed and vice versa. Therefore, a compromise must be found between these two variables.

In the following graph we can see the application of the IDA three-step, seen as an external intervention applied to a context.



Contexts change continuously

Changes don't follow a linear and predictable path. They can move in all directions as asserted by the *strategic evolutionist school* represented by the following graph:

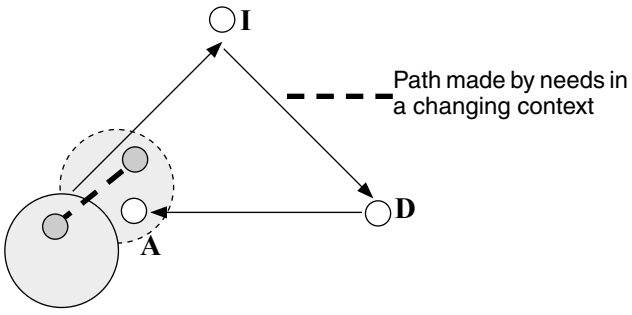


The evolutionist strategy teaches a short term planning, which makes all ways possible, and it implements the Darwinian survival instinct, based on diversification and adaptation. It doesn't believe in the total control over processes and asserts that changes are too quick to be predicted. It follows that it is extremely important to interact with all external inputs and to plan day by day.

The impact of a project

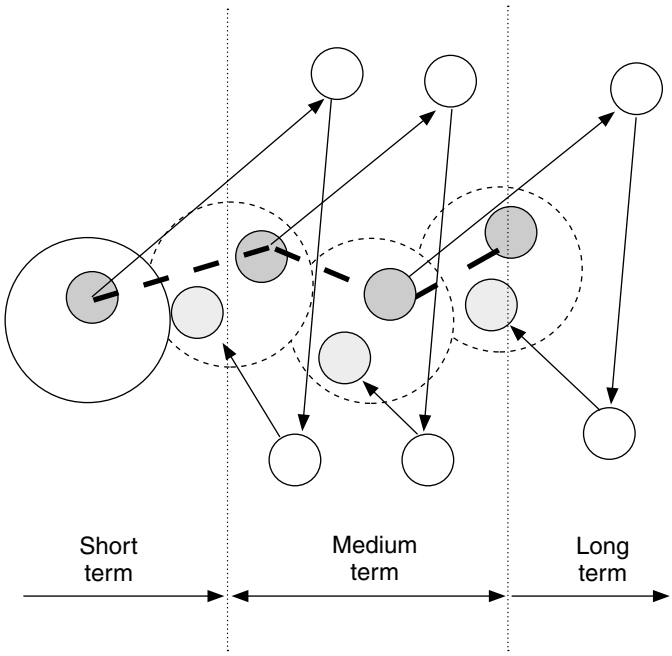
Impact is one of the evaluation criteria of a project. But, we need to highlight the difference between ***gross impact*** (including the changes of the context itself) and ***net impact*** (without the changes inherent to the context). Actually, since processes change continuously, contexts will vary regardless of the influence of the project. This means that measuring the impact of a project does not simply imply analysing the differences between the initial evaluation (picture of the project at time zero) and the final one. To measure the real impact of the project and its effective influence on the context, we should compare the effect of the project-impact with other factors such as chance, external factors or assumptions, etc. It is only in this way that we can estimate net impact of the project over a context.

We are now going to analyse how a changing context behaves in relation to a project that is a bit late in satisfying the needs expressed by that context.



In the graph we can observe how the initial need, represented by the little dark circle in the initial context (grey circle with continuous border) is satisfied after a certain time, when the context has changed and has moved to the position represented by the big circle with hatched border, through the white circle. Inside the hatched circle we have a second dark circle that represents the new need expressed by the same beneficiaries in the new context conditions. We can observe a gap between the dark and the white circles within the grey hatched circle. This distance represents the gap in relevance between the needs and the action that has been carried out. The bigger this distance is, the less the relevant it is and vice versa.

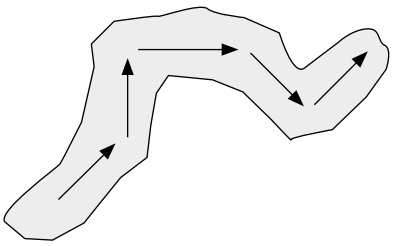
Let's analyse, in the following graph, the same phenomenon repeated tree times:



We can observe that the bold hatched line, which represents the path followed by the need in a constantly changing context, is not linear. The direction is not predictable. This phenomenon shows how it is difficult and incorrect to apply, in a simplistic way, the linear thinking to these phenomena.

This distortion is less important in the short term emergency contexts, but it is greater in situations of reconstruction and development. On the other hand, emergency has negative sides such as the lack of knowledge of the field and the fact that we operate in contexts that keep on changing and cannot be predicted.

What was described in this model is close to the proposal of the *Procedural strategic school* represented by the following graph:



It means a planning based on the retrospective analysis and on the continuous adaptation to the context. It is placed in the intermediate position between the previous schools (linear and evolutionist) and maintains that humans are incapable of making long term predictions. It does not choose the strategy but plans it continuously.

We are convinced that before following other strategic schools in a successful way, it is necessary to first practice the classic one. Actually, we can hardly apply the *procedural school* or the *evolutionist school* without experiencing the *Classic school,* because the former proposes a systematic repetition of the classic one transposing it into a Cartesian quadrant while the evolutionist one transposes it into a 360° perspective.

It would seem to us that the logical framework (ie. the one used in ZOPP) could be a starting point for a more complex analysis which could be roughly defined as the continuous and systematic application of the linear logic. This means that we should make many logical frameworks, one behind the other, in order to adjust a project to the changing context and to therefore keep its activities relevant.

The unknowledge of the context

The more rapid the reaction time the poorer the knowledge of the context. With rapid reaction time, less information is available and therefore less knowledge. This may be mitigated when the operator is already present in the field where an emergency action is carried out. In such a case we enter into the domain of the all too often hoped for *Continuum*.

The logical framework proposes a forced linear logic which. It allows predictable assumptions that are directly linked to the knowledge of the context only in the fourth column. Therefore, in an intervention designed for a scarcely known context it becomes practically impossible to predict the assumptions. What comes out is thus a forced exercise, purely theoretic and bureaucratic.

This consideration is particularly relevant if we think, for instance, about emergency interventions where operators generally lack good knowledge of the context and where contexts are in huge and continuous changes. As pointed out by Gray (lit **XXXXX**), the impact of external actions in such conditions is highly risky: The chance is very high that the proposed solutions could introduce problems that did not exist before the intervention.

Until this moment we have been speaking about the predictable field, leaving aside the unpredictable area. At this point, it becomes increasingly important to know the field in order to minimize the margin of error through converting the unpredictable into predictable. Actually, a direct relation exists between knowledge of the context and capacity of predicting positive or negative external factors. A higher knowledge of the context means a higher capacity to predict the predictable and a higher reduction of the unpredictable and so less risk. We can make the same analysis in the opposite sense.

Towards new quality criteria

Relevance versus efficacy

We want to develop the concept of relevance in the evaluation of the quality of a project, and subordinate the concept of efficacy to that of relevance.

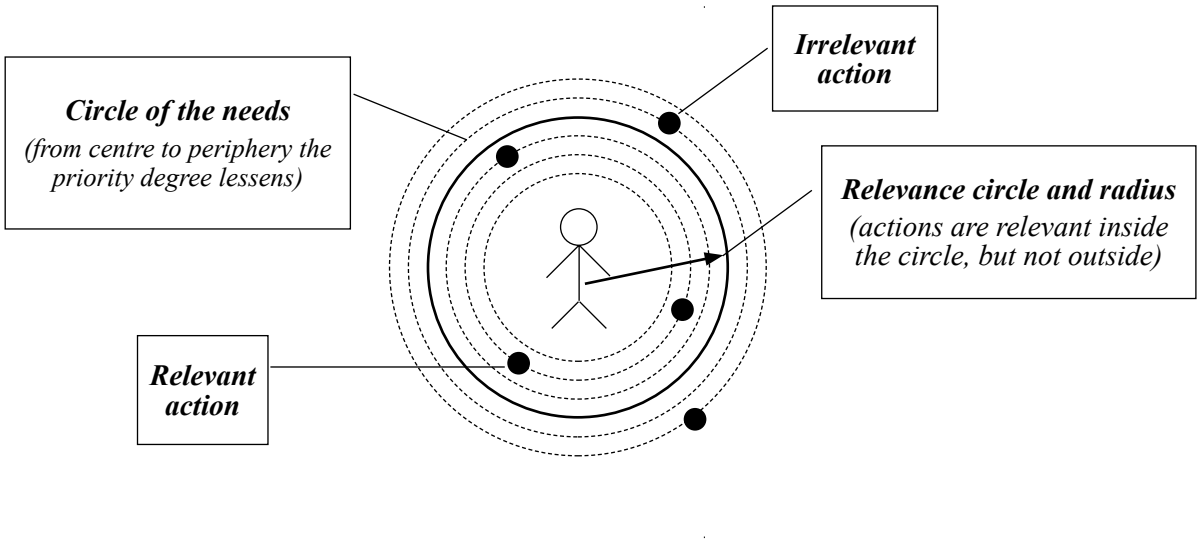
Relevance is a rich evaluation criteria and it can be associated to tree different themes:

- As to the *activities*, we shall ask ourselves the following questions: at the end of project time, are the actions realised still a priority for the beneficiaries? Would it have been possible to realise other activities more suitable for the population and for the context, in order to reach the same objectives?

- As to the *method*, we shall ask ourselves the following questions: the methodology used, was it the most suitable for attaining the expected objectives? Would it have been possible to employ other methods more suitable for the population and for the context, in order to reach the same objectives?
- As to the *objectives*, we shall ask ourselves the following questions: at the end of the project, are the objectives reached still a priority for the beneficiaries and are they suitable in the context?

In synthesis, the relevance of a project, and therefore the objectives included into it, can be measured by observing whether the project fits into the context and whether it falls within the "relevance circle" of the group of beneficiaries indicated as target of the project.

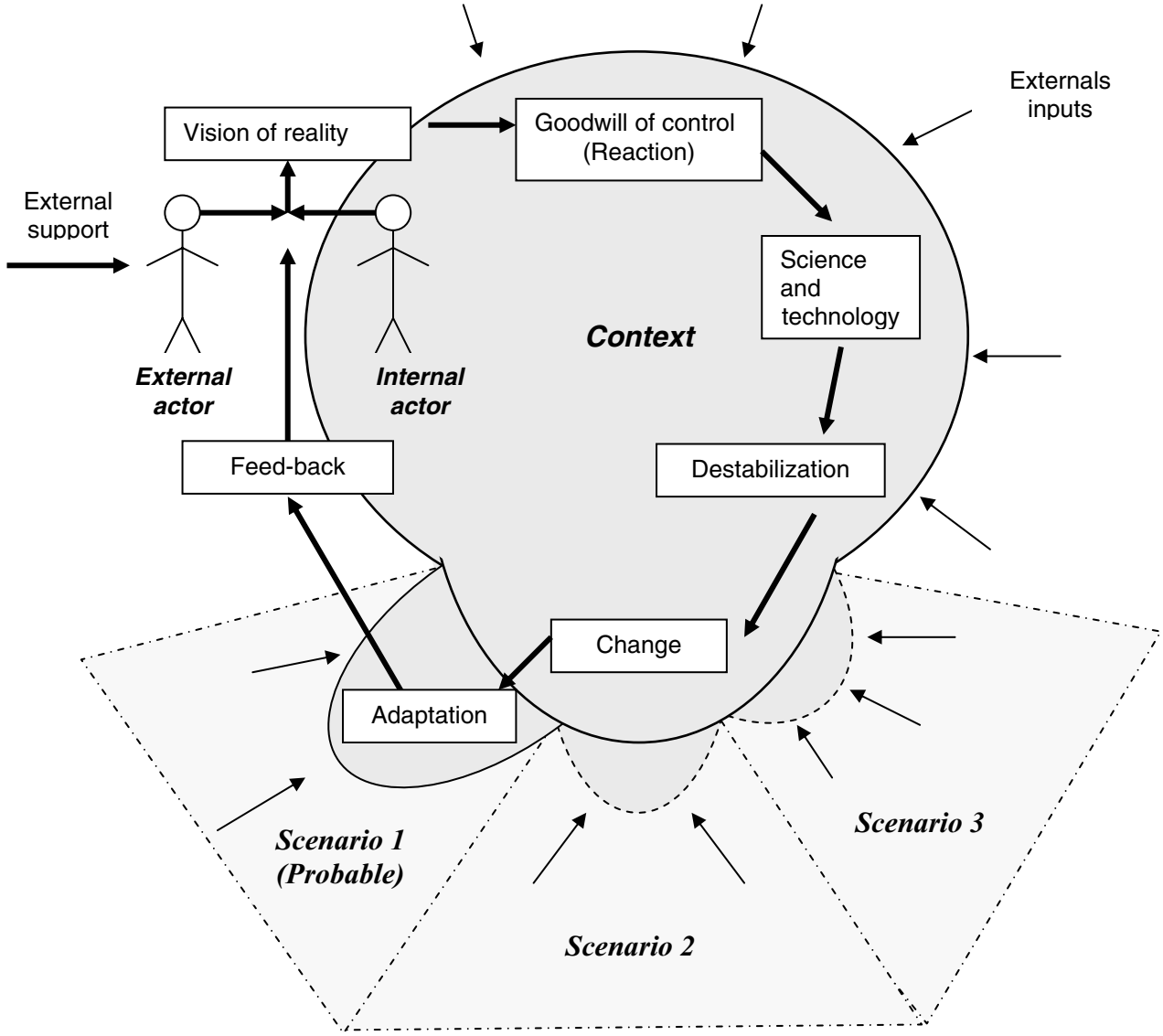
In the following graph we can see how, thanks to the interaction with beneficiaries, we can focus a vision of the reality we want to achieve. ***Reaction*** to the vision then happens, that is the goodwill of people to control the context. A project brings science and technology to the context in order to destabilize it and through change bring it to a new provisional balance which will again change autonomously, thanks to external inputs that have nothing to do with the project (auto-organisation of the Chaos). This ***adaptation*** results in the most probable scenario. At this point, a ***feed-back*** starts and therefore a new vision of reality and a new cycle of change. This process represents how an action of change should be inserted harmoniously into a *dynamic balance* that cannot be completely controlled by the directly involved stakeholders.



To react adapting to the chaos

Evolution is the sum of chaos and feed back (Joseph Ford)

We have seen how non-linear changing of the context badly fits with a linear analysis of the needs. We therefore propose a flexible projecting which adapts to changing contexts, in order to always remain relevant. This exercise requires a huge dose of creativity in order to be able to fit continuously into the new scenarios that will appear.



The scenarios

There is a discontinuity in reality, as it may change following a random and therefore unpredictable logic. The following are such scenarios, the possible changes of reality:

The example of the car: if you ask me which kind of car I would like to have, I could answer a green useful little car. This is my need today. If you come back in two years and ask me the same question, then I might be already married and with children and therefore I would rather need a "station wagon" car in a colour chosen by my wife. In two years time the satisfaction of the need I formulate now will no longer be relevant.

So when you asked me my needs, besides taking notes of my need in a precise temporal coordinate, you should also have elaborated and linked the need to a series of possible scenarios and should have adapted it to those scenarios. For example, it would have been advisable to know how old I was and what was my civil status; to know that these parameters at that age, could have easily changed, for example, towards a different civil status, so that the new need – derived from new conditions of life – would always have been a car but different from the one originally required, or maybe even a house!

This example shows us that the need expressed by the beneficiaries of an aid action should not only be evaluated by the external operator; but it should also be linked to a series of possible scenarios where the context and, therefore, even the future situation of the beneficiaries might change. A complex exercise, but more realistic than applying the linear logic.

A good external operator should therefore have a very good knowledge of the context and should be capable of defining a series of possible scenarios.

The probabilities

The use of scenarios, requires the appraisal of the probabilities of realisation for each possible scenario. Scenarios and probability should be analysed together.

To define probabilities we should know the context and its variables. That will help us to try to predict the unpredictable. Actually, there exists something called "persistency" of events which means that the more frequently some events appeared in the past, the higher the probability that they happen again. So the number of times a scenario happened in the past can help us to predict it. We just need to think about Central American cyclones. Entering into a dynamic of the Chaos means *seeing* regularity into irregularity, or what is called *persistence* of the *discontinuity* and therefore order into disorder. In the above mentioned example, we should try to infer that it is highly probable that a person, within a certain age, will probably get married in a near future. Marriage in this age group is a frequent event. But not precisely predictable for each individual.

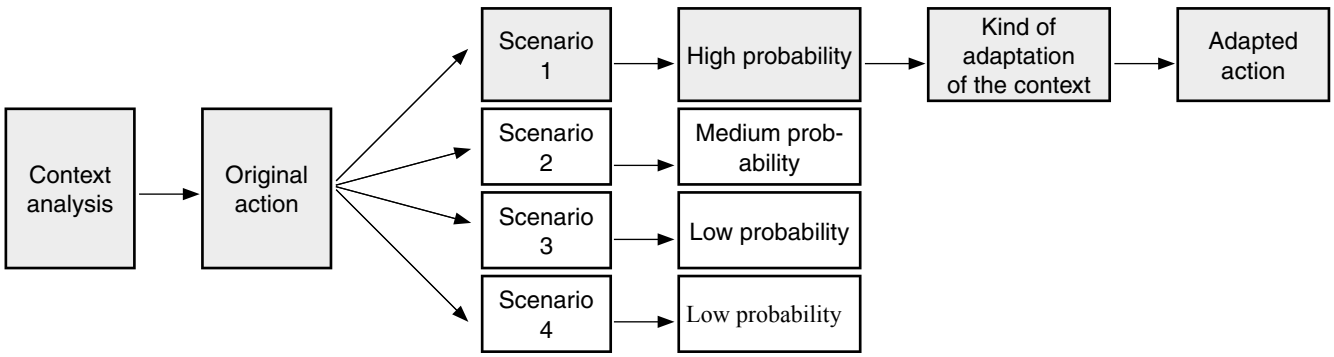
At this point it could be interesting to use the so-called *fractal attractors*. These are models to which reality conforms in the long term, allowing us to see only a few pieces; in other words, the global scheme of the "All" is hidden in the long term, but "visible" through little images which give a signal of what the future will be. We thus need to find the hidden *fractal order* in the nature of the things. It's like in a cross-words puzzle, in which a few characters let us guess by intuition the entire word.

The adaptation

When possible scenarios are drawn, we have to define for each of them the probability of becoming real; so, the resulting decision to adapt an activity will be defined according to the kind of adaptation of the context to the most probable scenario.

The CASPA method

In the light of what has been said, we suggest that the action should go all over the following path: ***context*** analysis, definition of the original ***action***, definition of possible ***scenarios***, assessment of the ***probability*** of realisation of each scenario, respective capacity of ***adaptation*** of the context and, from these elements, decision to ***adapt the action***.



Reviewing the present schema of the logical framework:

- In the logical framework, relevance as an important characteristic of a project does not appear.
- The vertical logic of the logical framework "constructs" a simplification of a certain problem, a simple model.
- A project should follow, in a relevant manner, a process which is not linear or one-directional. This means being able to continuously apply the logical framework within a process, in order to "read the evolution and to adapt oneself" rather than pretend to adapt or force the process to a partial analysis such as the logical framework offers.
- The logical framework, as seen above, follows a "linear logic" not always corresponding to real phenomena which in reality do not always appear cause-linked but rather accidental. Such phenomena can be understood only through a "lateral or circular" logic.
- The fourth column of the logical framework leaves space for "external factors", i.e. those which are "not controlled by the project". In the bibliography we find that only positive factors are considered, which means only those that can be seen as " matching measures" that we hope will occur. They come directly from logical tree-like representations and they appear as "concomitant expected causes of the same effect". The reference is thus to those "external" and "positive" factors which should go together with the realization of the vertical logic. The literature on the topic even suggests to formulate them in a positive way. This column should at least be modified by considering also the "negative" external factors that might happen. We should imagine not only positive factors or matching measures, but also negative external factors such as risks that might occur and that have little to do with tree-like representations of problems and objectives.
  In this case the famous algorithm used for treating positive external factors should consider also predictable risks, or definitely include a fifth column with scenarios, a sixth with probabilities and a seventh with the adaptations of the project.
  These last three columns would represent the relevance of the project.

In this way, the logical framework becomes an instrument for controlling the adaptation of the project to external events, both positive and negative.

Without expected scenarios, the logical framework could be presented to the sponsor with the three "pertinence" columns empty. In this way we start from the vertical logic of the first columns and, while the project is being put into practice, the scenarios lead to modifications. It is at this point that the three "pertinence" columns could then be filled.
With this instrument we should be able to dialogue with the sponsor.

The monitoring, reprogramming and adaptation *in itinere* of a project, thus, become more important than the initial programming.

Let us see an example in the *reformed logical framework* proposed on page 45.

Conclusions

- The logical connection of interventions within a ***continuum*** guarantees a ***better knowledge of the context and a greater ability to foresee scenarios***, thus lessening the risks inherent in external aid.
- We should participate in chaos in a creative manner, without wanting to control it or understand it completely: the definition of reality is just an illusion, a convention with which we might not all agree; chaos is changing and self-regulating, so we should ***be able to adapt ourselves***, to join processes and not to remain outside of them.
- A ***flexible, relevant and 'interactive with context' project*** is thus better than a rigid and effective one.
- ***Learning about Chaos from beneficiaries:*** beneficiaries lack media to react so they simply adapt themselves; but we have to learn from them the ability to adapt ourselves and bring them the media in order to help them to react. We need to handle methods and mechanisms in order to be able to constantly read contexts and their evolution through the eyes of the beneficiaries.

- We should learn to ***react adapting ourselves*** inside a ***dynamic balance***, to be creative.
- To strengthen the importance of ***monitoring and continuous adaptation*** in itinere and lessen the importance of rigid programming ex-ante.
- To reintroduce the budget spaces for the voice ***unforeseen***, within a scientific approach of chaos management, in order to refrain from using chaos as a justification for a bad knowledge of the context or for our projecting incapacity.
- ***To control the quality of the implementor on the field*** and not the project document or the derived bureaucracy.
- To evaluate the ***quality*** of a project by giving greater importance to ***the last columns on the right part of the "reformed" logical framework***, rather than to the linear logic used in the first columns.

Literature:

Gray: Strategic sense, strategic non sense
B. J. Lecomte: L'aiuto progettuale
James Glaick: Chaos. The birthing of a new science.
Carlo Jean: War, strategy and security
Whittington: What is strategy and does it matter? (1993)

	LOGICAL FRAMEWORK	INDICATORS OBJECTIVELY VERIFIABLE	CONTROL SOURCES	ASSUMPTIONS (Matching measures)	RELEVANCE		
					SCENARIOS	PROBABILITY	ADAPTATION
GENRAL OBJ.	Food situation improved	Since 1997 rice consumption has increased	Survey				
SPECIFIC OBJ.	Rice production improved	The yield increased of a X%...	Survey	Sufficient rain	Government decides importing rice at lower price	Medium	Substitution of the production with another profitable
RESULTS	1 Irrigation systems in functions 2 Availability of fertilizers in the area 3 Farmers know the technique	1 The irrigation net works 2 Farmers have each x Kilos of fertilizers 3 Respect of the timetable, etc	Visit Survey Visit	Good repair Transport at good price Will to use it	The importer of spare parts for motor pumps goes bankrupt	High	Stimulating a local trader to provide the service
ACTIVITIES	1.1 Make canals 1.2 Buy the motor pump 2.1 Organise purchases 2.2 Organise the distribution 3.1 Train the farmers 3.2 Train the trainers	Resources...	Costs....	Good local labour Spare parts store in the area A central store exists Good transport system Willingness to participate Existence of local trainers	Conflict between transporters and producers	Low	**New activities:** – To buy a medium of transport of one's own – Credit fund – Training in market analysis
				BASIC CONDITIONS – Organizational framework approved by actors. – Problems between breeders and farmers are solved.			