Stages of Reconstruction after an Earthquake and Expenditure of Funds

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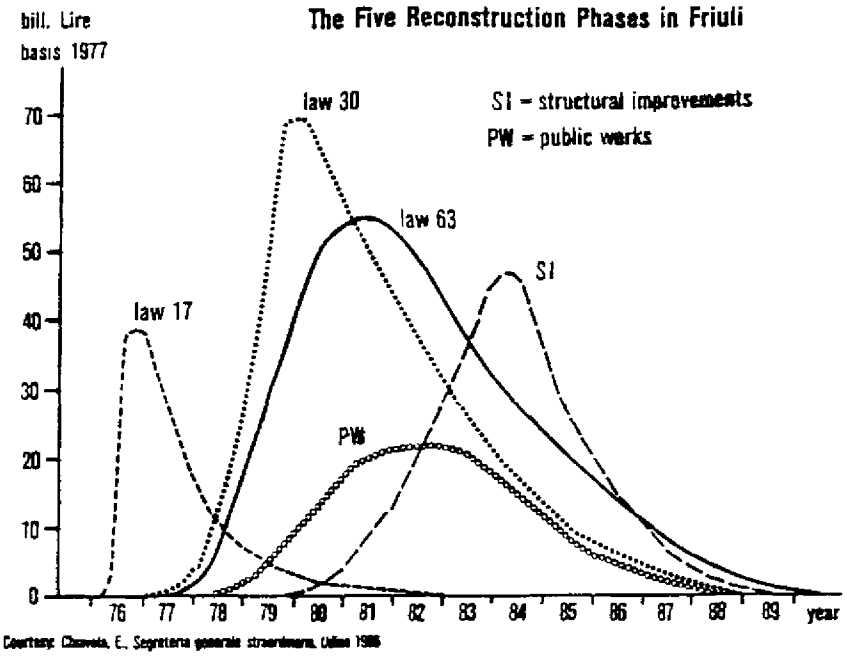
1. Verification of a hypothesis

As early as 1977, KATES and PIJAWKA postulated that reconstruction following a disaster lasts about ten years and can be divided into four typical stages, each approximately ten times longer than the previous one. Derived deductively from the examples of San Francisco 1906, Alaska 1964, Rapid City 1972, and Managua 1972 the model was based either on a historical disaster or rather recent ones where only half of the time in question had elapsed. Only Alaska met the prerequisites of the hypothesis in full scale. We therefore tried to test KATES' model against the reality we found during our research in Friuli/Italy beween 1976 and 1988, after the devastating earthquakes of May 6, 1976 and September 15 of the same year.

To our knowledge Friuli is the first greater disaster in history where KATES' four stages can be tested empirically. In Friuli 70 to 80 per cent of all funds dedicated to reconstruction were pooled by the emergency commissioner ("Segreteria straordinaria") with a precise accounting day by day, village by village and person by person: Rumors of fraud in previous disasters made this bookkeeping a challenge for the authorities in charge of the Friuli earthquake. Therefore the spending of funds exactly mirrors the reconstruction, because everybody who received compensation had to prove his title by his progress in restoration work. A building finished in the rough could claim 50 per cent of the compensation money, the ready building 100 per cent. If we define the four stages in order to measure them, stage one means emergency measures, stage two a functioning society (though under difficult conditions), stage three the physical reconstruction of the vital spheres of housing and workplaces, and stage four the complementary construction activities from sidewalk-paving to church building. The money spent on all these different expenditures in time makes it possible to quantify in a realistic perspective what happened in Friuli between 1976 and 1988.

Because of more pressing needs of the emergency commissioner's planning staff our research group was given all relevant data for processing and the following graph was derived from this material (fig. 1).

Fig. 1



It differentiates between five budget-groups; all figures are given in 1977 lire to adjust for inflation

1) Small repairs under law 17, of May 7, 1976,
2) repairs confirming with anti-seismic construction (law 30, issued June 20, 1977,
3) new constructions (law 63, issued December 23, 1977),
4) repair or new construction of public infrastructure (OP = opere pubbliche: public works),
5) repair or new construction carried out directly by the emergency commissioner.

Law 17 also prescribes expenditures for the establishment of the prefabs, including hereby the stage of restoration. The curve for these expenditures rises very steeply but also falls in the same steep way. This stage was essentially finished in May 1977, seven and a half months after the second earthquake in September 1976, when the 32.000 evacuees had to return from the seaside resorts in order to clear the hotels for summer tourism, one of the main sources of income of the region.

At the end of 1977 and with the beginning of 1978 the two main processes of private reconstruction began, under the provisions of law 30 for repairs and law 63 for new building. Part of the stage "Reconstruction I", their expenditure curve also rises steeply

and reaches its peak at the end of 1979 and the beginning of 1980. Compared with law 17 (small repairs and prefabs) the curves are much more smooth.

During 1980 the regional administration (SI) began rebuilding public infrastructure (e.g. schools moving out of emergency buildings, construction of municipal buildings and town halls). This curve rises but slowly, so that its maximum is not reached before the end of 1983. Somewhat earlier, at the end of 1979, other repairs and new constructions for infrastructures (PW) began. These two curves can be associated with stage "Reconstruction II."

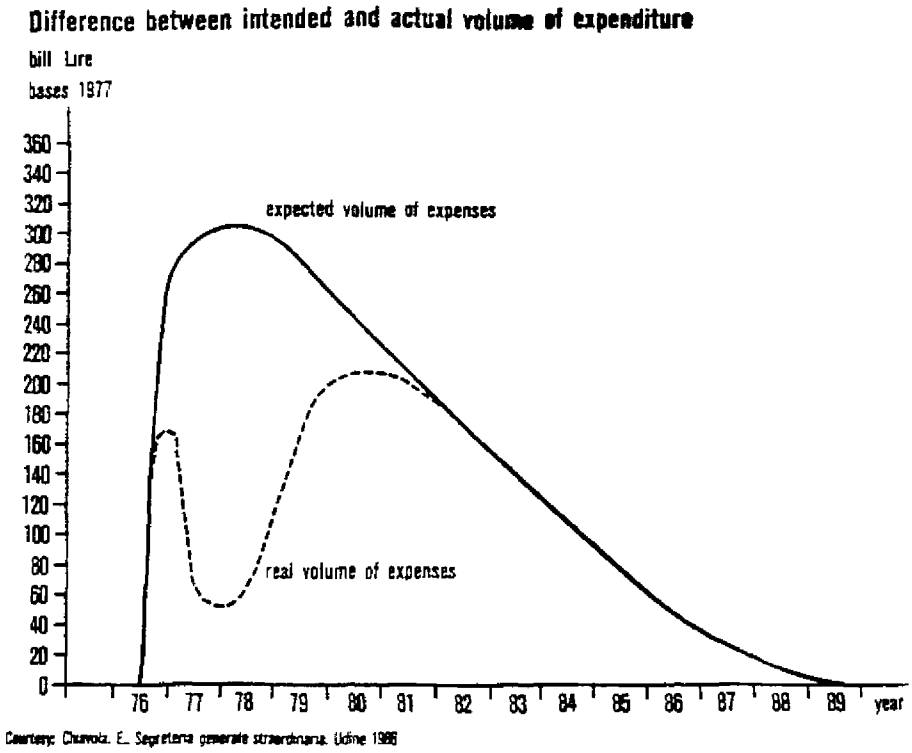
Indirectly, stage I (emergency) is also included in these curves. Stage I starts with the disaster and ends with the erecting of huts, where the accounting of the emergency commissioner began. Figure 1 shows that the single types of expenditures related to different activities roughly correspond with the theoretically postulated stages. If we would consider only the total of reconstruction expenditures we would find a curve of a normal distribution, indicating that every year up to the 1979 peak more money was spent until the volume of expenditures decreased little by little. Breaking this curve down to reflect the funds raised by the various laws we gain insights into the sequence of stages.

2. Critical moments during reconstruction.

Combining the expenditures of all five categories together, we find out that reconstruction follows a typical rhythm . The first crest of the wave is the stage of erecting solid emergency buildings. A wave trough follows, before the expenditures for the building of permanent houses and public amenities climb to a similar crest, lasting longer than the previous one.

The curve of expenditures during the stages after a disaster, when all the altruistic gifts and donations have been drained and international solidarity ceased, show the real activities in a disaster area (fig. 2)

Fig. 2



Courtesy: Chiavola, E., Segreteria generale straordinaria, Udine 1986

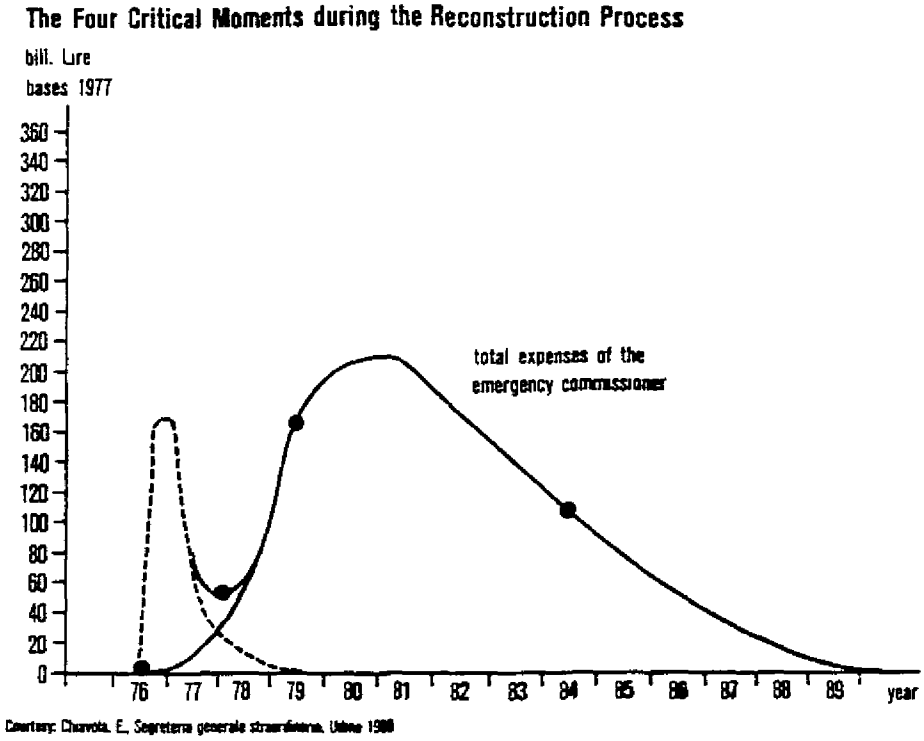
Notable in figure 2 is the big gap between the levels of real expenditures and the expectations of the victims and of public opinion. Evidently, a phase of consolidation is necessary after the construction of prefabs and the restoration of major urban services in order to plan, determine and organize the permanent reconstruction.

Precisely during this apparent 'low point of activities' the population, extrapolating in their minds the hectic activities of the emergency and restoration stages into the future, expects a peak of construction activities. This gap, as crisis managers perceive it, is the most difficult phase of the whole reconstruction period.

It is of great practical importance for the performance of the administration and their capacity to hold out, for their stamina, that this divergent course of the curve of expectation and the curve of possible realization during the first years of reconstruction be understood. This divergency of curves gives rise to four dangerous situations, and the manner in which they are dealt with is decisive for success or failure of reconstruction.

Again we can consult the diagram, showing expenditures in the course of time (fig. 3) and depicting what is really happening in the visible rebuilding of towns and villages. It reveals the four critical situations.

Fig. 3



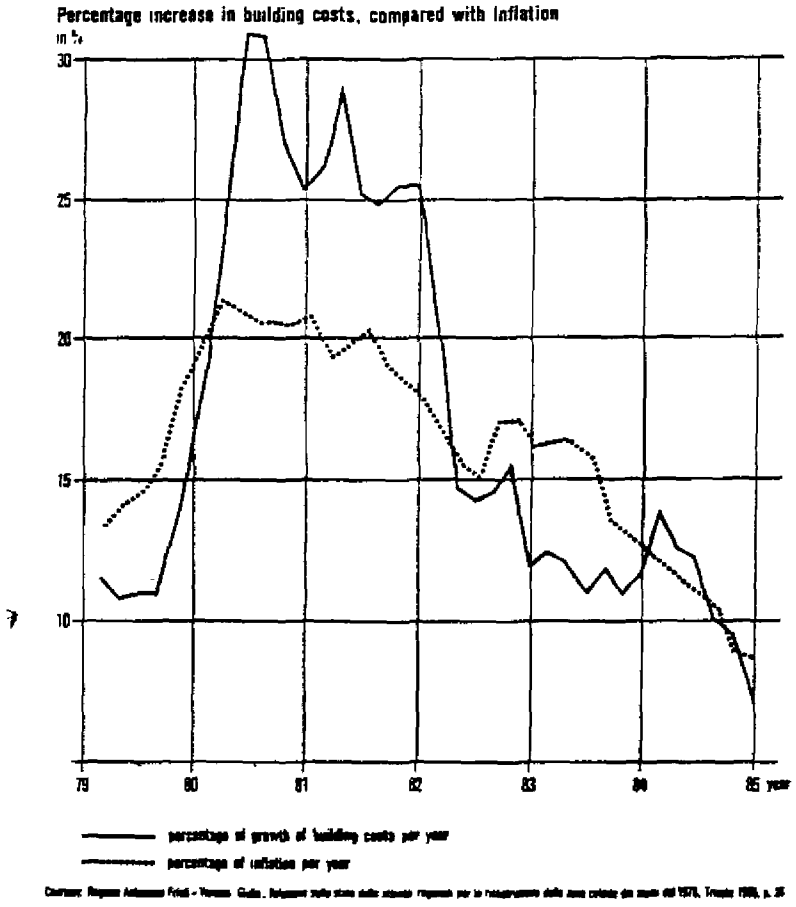
The first critical point, of course, is the disaster itself, where effective emergency measures have to be taken to carry the victims beyond the shock of the events and convey a sense of optimism for the future.

The second critical phase (with a duration of approximately 18 months between the middle of May 77 and the end of 78) lies exactly between the summit of the restoration and that of Reconstruction I, two stages that independently follow each other. The minimum between the neighbouring maxima represents the boundary-line between two processes and in Friuli was concomitant with calling back into office the previously dismissed emergency commissioner in spring 1977. After the dynamism of the first half year, the victims insisted on the accomplishing of reconstruction, the building of houses, and on greater activity generally. At this moment the necessary laws had not yet been issued, modalities of the payment of compensation not yet settled, the necessary controls not yet established, and plans not yet worked out. (All those measures of course could have been prepared before a disaster as a precaution. But this is very seldom the case in possible disaster areas, not even in highly developed and disaster-prone states, as the Loma Prieta earthquake shows). The forced idleness of victims, capable and ready to act on their own, leads to accusations against administration, illegal activities (illicit buildings), and apathy. In many disaster situations, reconstruction never passes this second point. It stops as soon as the international aid giving organizations have left the scene. Reconstruction must be considered as having failed. Only through a strict control by an able

administration, capable of enduring stress and of great stamina, can this second point of danger be conquered.

The third critical point occurs when reconstruction is running full speed and the opinion prevails among the victims that this will go on and on. This problem has a technical and psychological cause. Excessive demand, compared with insufficient building capacity, leads to a cost-explosion and corresponding difficulties in private and public construction. Numerous building firms were founded overnight to reap fast profits. This was facilitated by the fact that many Friulians worked as masons in construction gangs all over Europe and overseas. Conferring of contracts became chaotic. In 1979, with a general inflation rate of 21 per cent, construction prices mounted to 30 per cent and more above valid contracts, some exceeding 80 per cent. The share alloted to wages under Law 30 (repairs) in 1978 amounted to 72 per cent. Figure 4 shows the excess of building costs above inflation between 1980 and 1982.

Fig. 4



In the second half of 1980, 18 major construction firms from outside of the region were hired by the authorities to fulfill collective contracts (ca. 15 per cent of the whole construction-volume) in order to break up the local cartels, and this gave rise to angry protests against the "alienation from abroad".

But the 2,500 builders from abroad stabilized the market. The domestic firms felt 'ruined', but building prices returned to a level below the general rate of inflation. On April 30, 1985, this intervention was terminated, which brought the construction business in Friuli back to a seller's market with discounts of up to 20 per cent. But it heightened the tensions against "Rome" and Roman centralism, because many architects from abroad designed buildings following a cosmopolitan style and through this deprived Friuli of some of its identity.

Finally there is a fourth critical point, which is connected with the expiration of the reconstruction process. Most of the problems associated with it stem from the cases (ten per cent in Friuli) which for whatever reasons have not yet found a solution. This concerned not the weakest groups of society alone (old and/or handicapped people who fell through the social safety net), but also those who took too high a financial risk and now asked for an additional compensation, or those (specially old persons) who did not get any compensation or forfeited their titles out of carelessness. Finally firms are concerned which after the end of the building boom lost their clients, as well as workers threatened with unemployment.

We conclude here this overview of the course of the disaster-cycle in Friuli, which confirms that the overall duration of reconstruction here took indeed those ten years postulated by KATES and PIJAWKA. Of course the different stages also vary in spatial respect:

Smaller, mostly remote mountain communities needed more time before they could start with rebuilding.

Predisaster situation, social status and features of the locality (center or periphery), as well as building strategy (private or public), differentiated the program to a marked extent.

This application of an American model on the context of an Italian disaster will be part of the contribution of German social geography to the framework of IDNDR. The full text of these findings has been published in 1982 by George Allen & Unwin and this year in the Springer Series on Environmental Management.

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