

Nirmal Sengupta. *A New Institutional Theory of Production: An Application.* New Delhi: Sage Publications, 2001. Hardbound. Indian Rs 495.00.

Human interactive behaviour is determined by certain norms and accepted codes of conduct at all levels of social contact. These rules of behaviour define the parameters of social institutions such as marriage and family. However, behavioural patterns hold importance not only at personal levels but also in the life of a community or society. Resultantly, we observe the evolution of institutions in all spheres of economic and social significance. Due to their complexity and intricacy, institutions have found the interest of all social scientists, each analysing it under his/her own respective microscope.

Sengupta, in his attempt at defining a theoretical framework of institutions, has adopted a wider view of the subject by incorporating perspectives of not only economics but also sociology, psychology, history, and political economy. Based on an in-depth case study (Magadh in the state of Bihar, India) and sound mathematical proof, he builds the framework of how and why institutions in production are a result of co-operation and self-organisation stimulated by incentives of economic gains. The book makes comprehensive use of modern 'game theory' and its implications for interactive behaviour. The initial chapters of the book focus on the evolution and transition aspects of institutions while the latter once deal with the feature of structural stability—both sections are followed by references to the chosen case study.

The author borrows North's¹ definition of institutions, describing them as "the humanly devised constraints that shape human interaction" (p. 25). These restrictions justify the very need for institutions as they bring order into chaos and thus reduce risk and uncertainty. Each institution bestows upon its members certain attributes and finding a definite expression for these attributes or, as later referred to in more statistical terms, 'parameters' is the ultimate goal of the analysis. Self-seeking individuals have the incentive to free-ride. However, based on game theory, given repeated exposure to similar situations, the players realise the gains that lie in co-operation and thus a tendency towards institution formation is observed. Given that situations change due to exogenous as well as endogenous shocks, the analysis is extended to include the dynamics of change and to how a stable system responds to these changes. The parameters identified for institutional systems are role compliance and rate of return, and the model is summarised as "in the course of its existence an institution encounters constantly changing situations and requires to self-organise itself again and again, until one day it finally fails" (p. 29). For application of the parameters, the study chooses the neoclassical production function since most processes of production involve more than one person and compliant contribution of each participant.

¹North, D. C. (1990) *Institutions, Institutional Change, and Economic Performance*. Cambridge: Cambridge University Press.

Given that in an interactive play where benefits and costs are to be shared among all players the dominant strategy for each player is to free-ride, it is puzzling to see that institutions evolve and survive. However, the enigma is resolved when we introduce the long-term considerations and incorporate the adaptive learning process. Using simple yet effective mathematical mechanics, Sengupta shows that the proportion of defectors and co-operators is determined by the benefits exhibited through co-operative effort and once a *threshold level* of co-operators is achieved in a population, it automatically evolves towards a stable equilibrium, that is, “voluntary rule compliance multiplies by itself towards complete cooperation” (p. 57). However, the institutional process is vulnerable to collapse below this threshold level. The author also goes a step further by suggesting various methods of lowering this critical number. Once co-operation is established, the ground is set for the demarcation of boundaries of behaviour or ‘bundles of norms’ that can be called an institution.

Application of the above theory takes the readers to an absorbing account of the history of Magadh and the story of the evolution and organisation of the area’s indigenous irrigation institution; a tale well told. The survival of this institution to the present day suggests that the threshold level of co-operators must have been achieved in an earlier period and the ensuing rates of return had been high enough to make the set-up self-organised—making the choice of the case study an appropriate one. What is more interesting is the author’s approach that makes political processes, caste system predominance, and changes in religious inclinations in the area related to the evolving tank irrigation mechanism!

The focus of the book shifts from the evolution stages of institutions to their stability in the latter half of the book. This brings about a corresponding shift in analysis as well. Once the institution is established, so are the rules of the game, also referred to as ‘constitutive rules’ and every new player cannot become a part of the set-up unless she/he is aware of them—‘no more is it a game that the people play; this is now a game that plays people’² (p. 92). However, rules are made to be broken or, more close to home, rules are subject to change through new ideas and exogenous changes. These changes cause ‘perturbations’ in the stability phase of institutional life and threaten its existence. The author identifies a margin of maneuverability that exists in the system and this enables institutions to absorb small degrees of perturbations while retaining its self-organising capacity. Once these disturbances become persistent, the proportion of co-operators may be pushed below the threshold level and cause a collapse of the institution.

Once again Magadh is used to exemplify the transition of its irrigation organisations and its stability despite changes in political and social structures through the eighteenth and nineteenth centuries.

²Alverson, H. (1986) Culture and Economy: Games that ‘Play People’. *Journal of Economic Issues*, 20.

Before one can question the assumption of the simplicity of human behaviour assumed by the analysis, that is based on single rule of participation or defection, Sengupta takes the issue head on. Using the irrigation organisation as base, he explains that participants of tank irrigation can engage in various tasks independently or in combination with one another. This means that more than one course of action is open to the players and all institutional rules now operate “by creating classes of persons (positions), who are then required, permitted or forbidden to take classes of action”³ (p. 142). The decision process in this set-up involves pattern identification and its interpretation. Having done so, the next step is focusing the attention of the players on the focal point solution, since if this solution exists, the players do actually implement this solution despite the options available. Given that the roles of the players are defined, expectations about the behaviour of the participants can be formed and Sengupta proposes that if the first-order expectations and second-order expectations match, a structural equilibrium is attainable. He also includes an effective analysis of uncertainty and its resultant risk due to the limited access to information within an institution.

Interestingly, the study concludes that institutions also matter in the short run, and that history exerts a strong influence on the patterns of production. Given a favourable rate of return and compliance with the existing role structures of the society, a productive opportunity stands a good chance of materialising whereas any divergence from these conditions can become responsible for the demise of the same institutions. Modern institutions must emerge out of the transition of old organisations since any institution that is forced into place will prove ineffective in comparison to the traditional institutional structure. In other words, there is wisdom in the ways of the elders!

Institutional processes remain outside mainstream economics today and this book is a fairly good attempt at integrating the issue in contemporary research, especially in modern game theory. The complex and intricate nature of the subject demands an exploratory approach that does not touch the surface alone but also dares to look at what lies deeper. The claims made by the study based on deductive analysis and mathematical foundations are complemented by the selection of an appropriate case study. The narrative is quite descriptive and makes the book not only useful to economists but also interesting and informative reading for other social scientists.

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³Ostrom, E. (1986) An Agenda for the Study of Institutions. *Public Choice*, 48:1.