

Artificial Life meets Real Death playfully: Complex socio-ecological games with and for the rural poor.

By Luis García Barrios. Senior Researcher

El Colegio de la Frontera Sur; Transdisciplinary Research, Education and Outreach Centre in Mexico's Southern Boarder.

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ABSTRACT

The research & technology agendas of the Artificial Life community are of biblical proportions; they span The Genesis and the Apocalypse: the open and virtuous search for the origin and nature of known and unknown forms of life in the universe (which we embrace), and the hidden and vicious race for all sorts of superefficient bio-inspired-weapons (which we completely oppose). In the middle lie hundreds of interdisciplinary and very creative explorations through which scientists seek to incorporate the complexity, adaptability, creativity and intelligence of life into the properties of all types of contraptions, institutions, systems, goods and services in order to expand production/market niches and/or to make the endeavors and needs of current human mega-societies less problematic. Death remains in some of these agendas not by decision but by omission, based on pragmatic considerations: for the median human being (who is working class and poor), income growth opportunities are being deliberately cancelled in rural areas, while barely supported in cities by cheap and technologically sophisticated industrial/agroindustrial commodities. Consequently, most science and technology efforts and resources (after military expenditure) are oriented to the needs and opportunities of the industrial-urban paradigm. In impoverished countries, there are colleagues and scholars who doubt whether to fully embrace the promises and needs of the ongoing rural-to-urban Exodus or to (also) look at those left behind, dwelling as "living dead" in rural territories impoverished by the process. Those in doubt are told: "Let the dead bury the dead, and follow me" – "dead" meaning in the biblical times this phrase was uttered "those or that which does not matter nor affects us". The thing is that the rural poor totally matter as sentient beings, and they definitively benefit other's lives significantly in many ways. As an example, in spite of huge processes of land dispossession and rural impoverishment, small farmers still satisfy today around 60% of global food demand with barely 30% of the agricultural land. Many peasant-dominated landscapes are today a science/technology battlefield where the small-farmer family is simultaneously seduced and coopted by two contrasting projects which it pragmatically adapts to its circumstances: (1) to use as many agro-industrial seeds and chemicals as it can afford, or (2) to recover or further develop the agroecological knowledge and management of its ancestors. The first project is moving with the biotech/Alife revolution towards more complexity/knowledge in the lab & factory and more

simplicity/ignorance in the farm; the second project requires knowledge sharing and construction at the local level among farmers and with agroecology scholars. Farmers and agroecologist are by nature inclined to a complex view and practice, but most still need to fully understand, embrace and learn to navigate the biological, ecological and social complexities involved in this second project. We contend that many Alife scholars could significantly contribute to this need and find wisdom and fulfillment in the process. In the past two decades, as agroecologists we went out on a limb to explore and learn the science of complexity. We found inspiration in the seminal complexity research of (agro) ecologist such as Richard Levins and John Vandermeer and of our colleagues at Centro de Ciencias de la Complejidad-UNAM, IIMAS-UNAM and The Santa Fe Institute. Since then we have been developing in Mexico and Latin America full courses on socio-ecological complexity for graduate agroecology students with rural backgrounds, and short intensive workshops for farmers, as a long-term strategic participatory research & education project titled "Complejidad para Analfabetas". A key pedagogic element has been developing a dozen agent based models and board games to engage students in hands-on experiences that help them grasp in a short time processes such as feedbacks, equilibrium/disequilibrium, stability/instability, resilience, thresholds, bifurcations, catastrophes, nonlinear dynamics, chaos, fractals, network interactions and properties, emergence, multiscales, selforganized order, selforganized criticality, and complexity. All such tools are related to both ecological and social processes and simulate in stylized ways life processes at different scales (intracellular, plant/herbivore, field, household and watershed levels). Our most ALIFE related ABM is THE ALCHEMIST:Life in a Petri dish, which allows students to distinguish among ordered, complex and chaotic 2D cellular automatas, and to see how competition among two artificial self-organized food chains changes as one of them transits from order to chaos. Six of these tools (SIERRA SPRINGS: when death approaches; LAZARUS: back from the dead; THE TREE RIDER: free-riding payments for environmental services; RESORTES: land use planning, trust and cooperation; AGRODIVERSITY: sustaining out-of-equilibrium functional diversity; AZTECA CHESS: complex autonomous coffee pest control) have been played very successfully with some 350 men and women farmers- many of them illiterate- in the tropical mountains of southern Mexico. Our ultimate goal is to contribute to empower altruistically and agroecologically inclined farmers and scholars in their interactions with other actors. Our syllabus, teaching team, games and workshops await further development and a much broader audience; the Alife community is very welcome to contribute to expand this effort.