SUMMARY

The dissertation consists of three essays which deals with important global environmental problems, using a game theoretical framework.

The first essay deals with tropical deforestation as a global environmental issue and studies the possibility of an agreement between developing countries (or the *South*) and developed countries (or the *North*) to reduce the deforestation rate using a subsidy program. For this purpose, we study two scenarios: the first one is a *laisser-faire* policy, where the *South* solves an optimal control problem over a finite horizon; and the second is a Stackelberg game, where the *North* offers subsidies to the *South* in order to reduce the deforestation rate. The two scenarios are then analyzed and compared in terms of strategies, outcomes and forest conservation. In contrast to previous studies, our final results show that the subsidy program cannot be unconditionally implemented, in the sense that some conditions have to be satisfied to guarantee the *South*'s participation and in some case the *North*'s implication in this program.

The second essay is also concerned with tropical deforestation in developing countries. The objective of this essay is to determine incentive strategies for the *South*, conditioning the *North*'s transfers directly on the *South*'s actions regarding forest exploitation. These strategies can be used by the *North* to indirectly force the *South* to choose an optimal deforestation policy which is sustainable in the long run. We show that a linear-quadratic function of the transfer mechanism is one of the possible solutions to this issue.

Finally, in the last essay, we investigate if it is possible to reconcile two different approaches regarding the design of an International Environmental Agreement. We first study the problem from cooperative games perspective, on which the first approach is based, by analyzing three definitions of the characteristic function. Then, we address the issue of free-riding and stability of coalitions as defined by the second approach. Our results show that it is not feasible to reconcile the two approaches, which differs from 1998 Tulkens's conjecture.

Key words: Characteristic Function, Free-riding, Transfers, Incentive Mechanism, International Environmental Agreements, Stackelberg Equilibrium, Tropical Deforestation, Sustainability, Nash Equilibrium, von Neumann Morgenstern Solution.