GRADUATE AND POSTDOCTORAL STUDIES

McGILL UNIVERSITY

FINAL ORAL EXAMINATION
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

OF

RENÉ ROY
NATURAL RESOURCE SCIENCES

ESTIMATING THE VALUE OF ECOSYSTEM GOODS AND SERVICES FOR PRIVATE AND PUBLIC DECISION MAKING IN AGRICULTURE

MARCH 21ST, 2018
13H45

Macdonald Stewart Building, Room R3-045
McGill University, Macdonald Campus

COMMITTEE:
Dr. Robin. Beech (Pro-Dean) (Institute of Parasitology)
Dr. Benoît. Côté (Chair) (Department of Natural Resource Sciences)
Dr. Paul J. Thomassin (Supervisor) (Department of Natural Resource Sciences)
Dr. Robert Cairn (Internal Examiner) (Department of Economics)
Dr. Laurie Baker (Internal Member) (Department of Natural Resource Sciences)
Dr. Jackie Bede (External Member) (Department of Plant Science)

Dr. Josephine Nalbantoglu, Dean of Graduate and Postdoctoral Studies
Members of the Faculty and Graduate Students
are invited to attend

ABSTRACT

The three studies present a number of economic methods to assess and improve the sustainable development of the agricultural sector. The main objective of this research is to explore new economic methods to evaluate and promote environmental goods and services from agriculture.

The first study evaluates agricultural land as a source of natural capital in the province of Quebec using a geographic information system coupled with a spatial hedonic pricing model of agricultural land transactions during the period 1990-2010. The results show that although the total area has increased slightly, the average real value per hectare has decreased over time suggesting the average quality has decreased. This would suggest that the value of natural capital of agricultural land has decreased over time. The results support the existence of a law protecting agricultural land from other uses in order to protect the value of the natural capital. In addition, better land development planning could be implemented to avoid unrecoverable loss.

The second study investigates the cost of supplying an ecosystem good, i.e. improved water quality, from an agricultural watershed by adopting beneficial management practices. The scale at which the environmental policy is implemented has an impact on the cost of supplying the improved water quality. Setting the policy at the watershed scale is a lower cost alternative than setting the policy at the individual farm level. The study also investigated the factors affecting the ability of the farms to reduce pollution. The most important factor was farm size because it is more expensive for smaller farms to reduce pollution emissions since they have fewer opportunities. Policies should take this into consideration when designing programs supporting environmental protection initiatives.

The third study evaluates how price premiums on food items can be used as incentive for agricultural producers to provide additional environmental stewardship. Fluid milk is used as a case study and three evaluation methods were used. Contingent valuation, choice modelling, and hedonic pricing were used to evaluate the price

premium for environmental and health attributes. The results show that the location of production and health attributes were the most valued attributes while environmental protection and animal welfare provided low or no price premiums. The results generated from the three methods also provided additional information about the preferences of consumers and their behaviour. The environmental goods and services that generate private benefits such as health attributes induced a larger market price premium while those that were of a common-pool nature did not generate a price premium.

The dissertation illustrates how the agricultural sector can play a major role in future sustainable development. Agricultural policies in the area of sustainable development are more effective for common-goods while markets can support environmental initiatives that influence private well-being.

CURRICULUM VITAE

UNIVERSITY EDUCATION

2010-2018
McGill University
Ph.D. Agricultural economics,
Thesis title: Estimating the value of ecosystem goods and services for private and public decision making in agriculture.

2005-2009
McGill University
M.Sc. Agricultural economics,
Thesis title: Consumer valuation of food attributes: a comparison of willingness to pay estimates from choice modelling and contingency valuation methods.

2002-2005
McGill University
B.Sc.Ag. Env., Agricultural Economic Major, Agribusiness Option

EMPLOYMENT

Fall 2016
McGill University, Macdonald Campus
Instructor for the course Econometrics

Winter 2014
McGill University, Macdonald Campus
Instructor for the course Principles of Macroeconomics

2017-Present
Research Assistant, Agriculture Greenhouse Gaz Project, Agriculture and Agri-food Canada (AGGP project)

2010-2011
Research Assistant, Agriculture and agri-food Canada (WEB project)

2006-Present
CEO, Ferme Alliance 7 inc.

2005-Present
Macdonald Campus residences, McGill University, Assistant Life and Accommodations Director

2007-2016
McGill University, Macdonald Campus
Teaching Assistant for the following courses: Introduction to Statistical Methods (AEMA 310), Society and Environment and sustainability (ENVR 201), Accounting and Cost Control (AGEC 343), Science Literacy (AEHM 205).

AWARDS

2018 Ordre des Agronomes du Québec-Section Québec
2015 Blair Postgraduate Fellowship
2015 McGill Dobson Cup Start-Up Competition. Grit Prize
2015 Macdonald Campus Entrepreneurship Award
2015 Douglas McRorie Memorial Scholarship
2014 Canadian Dairy Commission Scholarship
2014 GREAT Award
2013 F.G. Woods Fellowship
2010 Provost Grad Fellowship
2004 Macdonald Class of '52- Spirit of Macdonald Scholarship
2004 Gold Key Award

PUBLICATIONS

Roy, René, Laurie Baker and Paul J. Thomassin. 2013. Estimating the Cost of Agricultural Pollution Abatement: Establishing Beneficial Management Practices in the Bras d'Henri Watershed. Selected paper at *the Joint Agriculture and Applied*

Economics Association and the Canadian Agricultural Economics Society Annual Meeting, Washington, D.C., August 4-6.

Roy, Rene and Paul J. Thomassin. 2015. La valeur des terres agricoles et son intégration au système des comptes nationaux du Canada – Une application de l'approche des prix hédoniques. In *Nature et économie: un regard sur les écosystèmes du Québec* edited by J. Dupras and J.P. Revéret, pp. 149-164. Montreal: Presses de l'Université du Québec.

Roy, René, and Thomassin, P. 2018. *Évaluer les avantages publics de différents scenarios d'intervention en zones cultivées visant la prestation de biens et services écologiques à l'échelle d'un sous-bassin versant*. Ministère de l'Agriculture et de l'alimentation du Québec, Québec.

Roy, René, Laurie Baker and Paul J. Thomassin. 2018. (*In preparation) Evaluating the private agricultural pollution abatement cost from the adoption of beneficial management practices under heterogenous landscape and farm characteristics*. Submitted to the *American Journal of Agricultural Economics.*

Roy, René, and Thomassin, P. 2018. (*In preparation) Estimating a Natural Capital Account for Agricultural Land Using a Hedonic Price Model*. Submitted to the *American Journal of Agricultural Economics.*