

# Western Center for Integrated Resource Management's Master's Degree Program at Colorado State University



*K.E. Miller<sup>1,3</sup>, R.K. Peel<sup>2</sup>, J.C. Kossler<sup>1</sup>,  
J.R. Batchelder<sup>1</sup>, and R.M. Enns<sup>2</sup>*

*Western Center for Integrated Resource Management,  
Colorado State University, Fort Collins, CO 80523-1683*

## Abstract

The escalating United States population is consuming open lands at an ever-increasing rate. The land available for public recreation as well as agricultural production has been significantly reduced. This decrease in available lands requires a highly efficient land resource manager who can effectively evaluate how resources such as land, water, wildlife, livestock, personnel, and finances interact to affect sustainability of the land resource. The Western Center for Integrated Resource Management (WCIRM) at Colorado State University seeks to develop these unique individuals through a hands-on, problem based approach to education. The WCIRM Master's degree curriculum provides the framework for graduates to develop a systematic, decision-making process to manage the land resource for sustainability and profitability. Each of the 11 modular courses is presented from an integrated perspective by a multi-disciplinary team of course leaders. Each course is conducted in two weeks with six hours of daily instruction to enable the program to achieve two goals: 1) provide students a focused, in-depth presentation of course material and, 2) allow the coursework to be accessible to full time students, part time students, and professionals.

## Introduction

The Western Center for Integrated Resource Management (WCIRM) at Colorado State University has established a Master's degree program that addresses the changing educational needs of the land resource manager. Faculty from six departments have coordinated teaching efforts to create an integrated approach for training present and future land resource managers. Various interdisciplinary classes have been developed to address social challenges in the twenty first century. These attempts to work collaboratively across discipline boundaries seem to be contrary to traditional teaching models. Three major problems face faculty in many collaborative efforts: 1) academics are not trained to work

together; 2) reward structure is biased toward the individual efforts; 3) existing administration structures are not oriented toward promoting or supporting collaborative work, especially when discipline, departmental, or school boundaries are crossed (Bohen and Stiles, 1998). The WCIRM Master's degree program has overcome many of these problems through a supportive network of administrators at Colorado State University. Success of faculty collaboration in teaching will hinge upon five principles: 1) clear and common vision; 2) excellent leadership; 3) institutional and individual commitment; 4) adequate financial resources; 5) proper incentives and rewards (Bohen and Stiles, 1998).

Interdisciplinary education has already proven successful at other universities, such as Harvard, where the David Rockefeller Center for Latin American Studies achieved success through the previously mentioned five principles. Eight faculty members contributed to a program that integrates international affairs, architecture, biology, Latin American history, public policy, theology, and education (Bohen and Stiles, 1998). The interdisciplinary approach to education allows students to have a well-rounded education, with a real world purpose.

The nature of modern business requires an interdisciplinary education. Logically, training which prepares individuals for professional success should provide this requirement. The State Agricultural Experiment Station system has indicated a need for multidisciplinary collaboration within and among universities to become the norm in research and education (Fischer and Zuiches, 1994). The adoption of collaborative efforts in universities should not mirror the adoption of Total Quality Management (TQM) principles; where industry adopted the principles in the early 1970's, and universities did not adopt until the 1980's (Cross, 1998). Universities should lead or instigate change in industry, while preserving economic efficiencies. Programs that recognize the need for interdisciplinary education and provide this type of instruction will develop

<sup>1</sup> Graduate Teaching Assistant

<sup>2</sup> Assistant Professor

<sup>3</sup> Correspondence information: Kevin Miller, E 102 ARBL, Fort Collins, CO 80523-1683; email: kmiller@holly.colostate.edu

individuals with the capacity to be leaders in a variety of industries.

The mission of the Western Center is “to improve the sustainability and profitability of forage-based agricultural and natural resource systems through integrated, innovative, multidisciplinary research, and educational programs.” This mission recognizes that the land resource managers of the future will require a unique education in order to respond to the changing agricultural landscape.

## **Program Objectives**

The development of the Master's degree program provides a multi-faceted education to present and future land resource managers. Graduates of this program must be able to deal effectively with situations within their area of experience and recognize when outside assistance is appropriate. The objectives of the program are to prepare graduates who can: 1) access, analyze and synthesize information to solve problems; 2) function effectively as a team member and a team leader; 3) effectively communicate through writing, speaking, questioning, and listening; 4) understand the international and domestic scope of agriculture; 5) develop an effective network of professional contacts through on-site management experience; and 6) expose the opportunities and challenges confronting rural communities.

Accomplishing these objectives requires a dynamic approach to educating students, as well as practitioners. The educational modules are designed to provide information to assist landowners and land managers in accomplishing their goals by providing extensive, yet in-depth information regarding the interactions between land, livestock, wildlife, water, financial, and human resources. In addition, the modules will train students to understand the functional processes that drive these interactions, as well as how these processes form systems that require holistic thinking for sustainable systems management.

The future challenges facing these graduates will require much more than technical skill. Sustainable management of systems requires quick, yet comprehensive thinkers and communicators who can react to the often rapidly changing environment of the land resource (Grant et al., 2000). Additionally, a manager must be capable of effectively communicating with other managers, employees, and the public, as well as functioning as a member of the community at local, state, and national levels. This program strives to equip these managers with the ability to solve problems from a resource sustainability perspective. Inskeep (2000) suggests that students need a greater knowledge base, to better understand the function of the animal and its place in the global production system.

## **Master's of Agriculture Degree Program**

The Master's degree program offered through WCIRM offers this expanded knowledge through an integrated curriculum. The integrated educational approach is designed to enhance management skills, as well as, provide a framework for development of problem solving skills through the involvement of faculty from the departments of Agriculture and Resource Economics, Animal Sciences, Clinical Sciences, and Rangeland Ecosystem Sciences. Extension personnel and industry professionals will also contribute to the curriculum in their respective areas of expertise. This approach offers a unique opportunity for students seeking an integrated Master's degree with a focus on land resource management.

The WCIRM Master's degree program is not specie or discipline specific, as the program is focused around the concepts of systems management. Coursework is structured to provide the knowledge and skill required to establish a framework of decision-making tools. The basics of each course are established early in the program to unite students from various backgrounds into the same educational experience. The 11 newly designed courses, each with a central theme, are presented from an integrated perspective. Table 1 gives a brief description of the 11 classes to be presented and the sequence in which they are presented. Faculty members from each of the departments are present in each course to provide different discipline perspectives throughout the curriculum, as well as to monitor the progress of each course and facilitate maintaining a common vision among faculty members.

Coursework presented will address areas of relevance to the land resource manager, including human, financial, livestock, wildlife, water and land resources, and policy issues (Taylor, 1994). The principle of Integrated Resource Management is the focus of the first course. This course stresses the methodology necessary for implementation of an Integrated Resource Management plan and the necessity of including human resources in these plans. Students will revisit this concept in the eleventh and final module when they produce their own integrated management plan using an existing land resource as a case study. The fundamentals of business development from the ground up are presented in the second course a requirement for sustainability. Subsequent courses address topics of land resource ecology and the importance of plants, animals, economics, and their interactions for a profitable system.

Every course addresses process enhancement to manipulate the rangeland ecosystem to increase productivity and establish an optimal cost benefit

Table 1 WCIRM Graduate Courses with Course Description

Course Name	Credit Hours/Term	Course Description
Integrated Decision Making and Management Skills	3 Fall	Introductory course to the graduate program. Topics to be covered are: motivation for management, decision-making, introduction to systems, information management, and introductory statistics, while focusing on effective communication.
Building the Business	3 Fall	This course is designed to equip students with the skills required to organize and implement a business. The tools learned in this course will be applicable to managing a farm, ranch, or any small business.
Understanding and Managing the Land Resource	3 Fall	This course will introduce to current and future managers the fundamentals of natural resource response that contribute to successful land management. How to read and understand the land, with impacts of ecological process on ranch products and the use of mechanism-based understanding to produce reliable management response.
Biological Animal Interactions	3 Fall	This course will envelope a working knowledge of a process to deal with nutritional issues, evaluate the impact of management on the ability of the resources to furnish nutrients to meet animal needs, and feed the animal to meet production goals.
Animal Production Systems	3 Fall	This course addresses specific issues involving development of animal management systems for one or more species of animals produced wholly or partially in a forage-based environment. Additionally, the ecological, economical, and managerial factors affecting animal production with an overall goal of obtaining desired product outputs and profitability.
Integrated Grazing Management	3 Spring	This course will focus on understanding plant growth, animal foraging, and the plant-animal interface. These factors will be used to create grazing management programs to achieve desired land, animal, and economic responses.
Analyzing and Managing the Business	3 Spring	This course focuses on the fundamentals of managing the business of resource management. Students will learn to assimilate, prepare and analyze records and financial statements from an enterprise, and learn to formulate a functional budget from records and summary information.
Understanding Policy and Emerging Issues	3 Spring	This course will draw from commonly used materials from natural resources, animal sciences, and economics about community issues including: food safety, public lands, water, animal rights, and the environment. It will also focus on current issues directly applicable to the majority of the group, expose students to social goals, and on teaching the policy process.
Monitoring for Success	3 Spring	This course will address the process of effectively gathering information in regard to management meeting the operational goals and objectives of the operation.
Products to Profit	3 Spring	This course will focus on agricultural marketing of all aspects of the land-based enterprise. Potential products and opportunities at different stages of production will be addressed.
The Integrated Resource Management Plan	3 Spring	This course revisits many key concepts presented in earlier courses. These concepts will be solidified and woven into a management plan for the resource system.
Internship	3 Fall or Summer	The six-week internship gives students the opportunity to experience management of a complete system in the real world. It also, allows for networking with industry professionals for future resources and partnerships.

relationship. Additional tools to modify interactions between the animal and ecosystem base are a common theme in every course. The interaction between animal performance and the ability of the forage resource to supply the nutrient demands of the animal is explored in depth. The benefits of management for a diversity of wildlife, as well as, classical food producing animals are also discussed. Only through the dedication and commitment of the faculty and other individuals involved in the program will this integrated format be successful.

The curriculum for the IRM masters program has been extensively evaluated by the Colorado State University curriculum committee and unanimously approved as graduate level courses. The cost of this program is the same as any other CSU graduate program. Tuition costs are based on the number of credit hours enrolled. Industry professionals are eligible to participate in the courses and the cost is the same as required of the full time students. Currently, there are 12 self-funded students enrolled full-time in the WCIRM

Master's degree program in its first year. An advantage of the program is the accelerated nature; students can complete the master's degree in one year or may take up to five years, on a part-time basis, to complete the degree. This allows for working professionals to make arrangements to earn a master's degree, while continuing their career.

A modular format has been selected for presentation of the coursework, which allows students the opportunity to concentrate on one class at a time. The intensive format will retain the focus of the students and provide the foundation for learning throughout the curriculum. The adoption of modular education is a somewhat unique approach to graduate education. The definitive nature of a modular education program is the short, intense class. The modular format can link theory and practice, between education and skills used on the job. This format retains the attention of students and offers a regular feedback system (Kadau, 2001). Modular education has four main advantages: 1) concentrated learning with immediate application; 2) learning reinforcement; 3) organizational control; and 4) easily modified programs (Kadau, 2001). These four advantages allow for

greater flexibility of the educational methods. The short time commitment per course facilitates the availability of the classes to land owners and managers, forest service personnel, etc. to attend specific courses that will enhance their job performance.

Upon completion of the curriculum, students will have an understanding of how alterations in production strategies often influence various aspects of a land-based enterprise and can potentially impact long-term profit and sustainability of the land resource. In addition to the coursework, students will complete an internship and develop a professional land management plan. Each of these requirements provides opportunities for students to gain industry and/or land management experience and further apply skills and knowledge obtained through the coursework.

### Educational Outcomes

The benefits of a Master's program integrating

dedicated students and specifically integrated course content are numerous and diverse: 1) WCIRM focuses on training competent future resource management professionals and the success of the program will be determined by the success of students in industry and management positions. 2) A multi-departmental program provides a multi-disciplinary knowledge base, which will allow graduates to function successfully in a variety of management scenarios, regardless of where their careers may lead. 3) The development of critical thinking skills, combined with a comprehensive, yet in-depth knowledge base, facilitates problem solving and analytical skills critical to managing complex and dynamic environmental and production systems. 4) Understanding the processes that drive systems allows students to think about systems holistically and anticipate the long-term effects of manipulating processes toward desired outcomes. 5) Learning to evaluate the land and animals facilitates a greater understanding of the system functions and the effects of management for sustainability. 6) Interactions among students, between students and faculty, and between students and industry professionals provide diverse learning opportunities and real-world experience for a truly integrated classroom. 7) Developing communication skills, both verbal and written, provides skills graduates require to present, share, and receive information in the increasingly communal community of land-based resource management. 8) These skills, combined with the confidence of a highly trained graduate in land resource management, allows students upon graduation, to function as members of their communities from local to global levels, and to continue making a contribution to the industry of land-based natural resource management.

## Literature Cited

- Bohen, S.J. and J. Stiles. 1998. Experimenting with models of faculty collaboration: factors that promote their success. *new directions for institutional research using teams in higher education*. Cultural Foundations for Productive Change. Number 100: 39-55.
- Cross, D.W. 1998. Evolution or revolution: creating a team-based organization. *new directions for institutional research using teams in higher education*. Cultural Foundations for Productive Change. Number 100: 83-95.
- Fischer, J.R. and J.J. Zuiches. 1994. Challenges confronting agricultural research at land grant universities. CAST: Council for Agricultural Science and Technology Issue Paper 5.
- Grant, P.M., T.G. Field, R.D. Green, and B.E. Rollin. 2000. The importance of comprehensive agricultural education in land-grant institutions: A historical perspective. *J. Anim. Sci.* 78:1684-1689.
- Inskip, K. 2000. The challenge of graduate education in the academic environment of today and tomorrow. *Proceedings of the American Society of Animal Science*. Available: <http://www.asas.org/jas/symposia/proceedings/0921.pdf>. Accessed April 1, 2002.
- Kadau, C. November 2001. The advantages of modular education. *Tech Directions*: 30-33.
- Taylor, Robert E. 1994. *Beef production and management decisions*. 2nd ed. New York, NY: MacMillan Publishing Company.