

**University of Ballarat**

**Future Research Directions**

**Regional Futures  
(REGIONAL ENTERPRISE SEGMENT)**

# Research Theme: Regional Futures

## Executive Summary

This research theme will focus on facilitating and generating research directed at providing knowledge to stimulate innovation and growth in regional enterprises and to assess the modern condition and the capacity of regional environments to support this. This deliberately integrative, interdisciplinary approach will drive activity in regions that enhance economic activity, improve social capacity and adaptation to change and to identify levels of activity that enable the natural environment to persist, and be sustained into the future.

- a. The Research and its International Significance: This integrative research program, divided into regional enterprises and regional environments, focuses on the growth and development of regions in a complex system. In this system inadequate and weak market signals may necessitate regulation, policy ‘nudging’ (Thaler and Sunstein, 2008) and sometimes significant subsidy to achieve satisfactory and sustainable outcomes. Regional futures are also affected, in a significant way, by successes and errors in the past, and history and path dependencies play an important role in this research program.

The research into *regional environments* will examine the past and present capacity of catchments to achieve the multiple, and sometimes contested goals, of economic development, the maintenance of ecosystem services and the rehabilitation of natural ecosystems. It will identify factors limiting development in regional centres and their service areas and pursue innovative approaches that increase the capacity of these enterprises to increase their functioning and resource use efficiency enabling them to become resilient to external threats such as international market change, labile labour markets and climate change. It will audit the present condition of natural systems and evaluate the responsiveness of catchments and ecosystems to past drivers of change to assess system resilience and the sustainable level of development into the future, under changing climates. By virtue of being developed early after first settlement, being in a temperate zone suitable for intensive agricultural development, being proximal to Australia’s largest centres and being a ‘climate hotspot’ at risk of a globally exceptional decline in wet season rainfall (Giorgi, 2006), regional south-east Australia faces economic and environmental challenges as great as any on Earth. The Regional Futures research theme will advance research programs that will engage with the challenges of evaluating the contemporary and future sustainability of regional activities under a Resilience Thinking paradigm and pursue, identify, and through engagement with regions, implement actions that increase the adaptability of natural and human systems to future challenges.

The research into *regional enterprise* will examine enterprise development, population change and human capital, and the capacity of communities and economies to adapt to exogenous and endogenous shifts in their environment. The enterprise development project examines how enterprises develop and ‘fit’ with their region, when ostensibly they are disadvantaged by location and lack of scale. This work includes the development of both social and business enterprises and examines the role of innovation as a response to environmental change. The population and human capital strand addresses the associated problems of restricted regional population growth and the associated issues of labour market skill shortages and the ability of regional enterprises to compete nationally, sometimes without the requisite skilled labour. An important aspect of this project concerns the ageing of regional populations and the challenges of youth retention and attraction. The adaptive capacity project concentrates on a central issue of complex systems – the social adaptation and feedback processes, which allow communities to progress in the face of exogenous

change. This process can be facilitated by market signals and complementary innovation in information and communications technologies.

Underpinning all of the Regional Enterprise projects are methodological innovations pioneered by CRIC and WIDCORP. In particular the psychological measurement of well-being and its impact on choices and behaviours is used alongside economic signals and uncertainty; in addition the CRIC and WIDCORP team will work closely with the CEM team in using the notion of complex systems to assess direct, indirect and feedback effects.

Further to the specific research questions raised in this integrative program, a longitudinal data base will be assembled as a panel of leading indicators of social, economic, environmental and innovative capacity. This panel data will be a resource for researchers as the program progresses and in particular will provide a real asset to future doctoral researchers investigating the unfolding of regional futures.

- b. Capacity Building Activities and Research Capacity: The Regional Environments theme will employ a 0.6 Senior Research fellow who will engage with the regions, identify research opportunities, aggregate research capacity and facilitate, lead and/or directly develop and participate in research projects. The Regional Enterprise theme will consolidate relationships with international researchers by bringing to the program their expertise. Regional Futures will develop an advisory board of public and private sector leaders of regional enterprises and environments. Interaction with these will expose those in the region in need of research to the capabilities available within the theme, and tailor the Theme to focus on the important issues in the region.
- c. Collaboration: For the Regional Environments theme, collaboration will be developed with CSIRO Atmospheric and Marine Science (Jones), CSIRO Sustainable Futures (Walker), Deakin University Life and Aquatic Sciences (Sherwood, Quinn), WIDCORP (McRae-Williams; Schwarz), Loughborough University (Wilby), University of Melbourne (Land & Environment). For the Regional Enterprises theme, collaboration will be at two levels: 1) with policy makers in DIIRD, AusIndustry, DPCD, DPI, regional water authorities and DHS; and 2) Australian university researchers at Deakin, Latrobe, RMIT, University of Tasmania, University of Adelaide, Swinburne and international researchers from Bristol, Durham, CEIBS and Wales.
- d. Relationships: Key industry and government partners include DSE, DPI, DHS, DIIRD, RDV, MMV, Local Governments, AusIndustry, Office for Women, BREAZE, CVGA, all relevant catchment management authorities and natural resource management boards, Greening Australia, CSIRO, ANSTO, Parks Victoria, Carbonplanet P/L; Sovereign Hill and other companies/institutes identified under c (above).
- e. Funds Requested: \$1.709M over 5 years (\$628K – Regional Environments; \$643K – Regional Enterprises; \$438K - Shared expenses)
- f. Expected Outcomes: Outcomes will include: a closer engagement between UB and regional research consumers; a stepped increase in UB research success in category 1 research income in the areas of regional environmental and regional economic sustainability; a widely acknowledged presence of UB in the field of climate change, enterprise development and adaptation within social and environmental realms.

## **Research Plan**

### Overview

Regional Futures will operate through two, closely articulated, research programs: Regional Environments and Regional Enterprise. Together they will provide an integrated approach enabling regional communities to review the present state of their environments, communities and industrial economies to take advantage of opportunities such as innovative approaches and changing demands and to adapt to changing resource availability e.g. water under changing climates.

### Development of a Panel Database of Enterprise and environment indicators

Much of the interest in social science and environmental research resides in the ability to understand the complexity of change, related to behaviour, the environment, community dynamics and business innovation. In order to understand change and its influencers, it is necessary to have longitudinal data capable of monitoring change over time. Therefore, a recurring task within both programs, and within all projects, is the development of a panel data base, which incorporates cross-sectional data on leading indicators over time of environment, enterprise, social conditions and individual well-being. This panel data set will integrate published data with data from the Regional Futures research program. The panel data provides an empirical assessment of changing conditions in the regional population over time and will be a unique source of data for future researchers interested in how change occurs over time and across activities in a region. This will incorporate 1. available current and historical evidence of long term environmental, economic and social change; and 2. ongoing changes in leading indicators of economic, social and physical environments using monitoring data such as field assessments, questionnaire and survey instruments. CRIC has already undertaken pilot work in this area through a number of environmental and social perceptual and attitudinal surveys.

### **Research Program 1: Regional Environments**

Regional Environments will address issues of natural resource management across south-east Australia with a view to developing a research program that is national and international in significance and outreach. Regional Environments will have three projects or research foci: a. Water and Climate; b. Sustainable Catchments, and c. Ecosystem Restoration.

### Background

The south-east of Australia has been a focus for intensive agricultural activity for much of the last two centuries. Through this period it has been subject to an ongoing phase of desiccation (Jones *et al.*, 2001), mostly attributable to increased temperatures driven by both natural cycles and increased emissions of greenhouse gases. From early in settlement there has been considerable direct impact to natural systems including fragmentation and contraction of stands of high integrity habitat, changing fire regimes to those that are more frequent and intense, hydrologic instability leading to elevated water tables and land salinisation, loss of soil surfaces and increased fluxes of sediment and salts to wetland sinks, increased abstraction and regulation of waterways changing natural flow regimes. These changes have wrought considerable damage to natural systems with most wetlands now considered to be in degraded condition (SoE, 2001; Norris *et al.*, 2002; Gell *et al.*, in press) and many species considered threatened. These changes have diminished the ecosystem services provided by natural systems by impacting on water supply and quality, driving loss of soil fertility and land degradation, reducing protection for stock and crops and heightening the impact of pest plants and animals. Recent developments have sought to develop new industries on regional landscapes e.g. agro-forestry, at scales previously unknown, raising the prospect for ongoing, and

possibly accelerated impacts on natural systems. In parallel with these direct landscape changes have been clear changes to regional climates, specifically surface temperatures and effective rainfall. Past and present industries have diminished the level of ecosystem services provided by the natural systems and this is likely to decrease further under climate change scenarios and the intensification of resource use. The management of regional environments needs clear and objective evidence of the capacity, adaptability and resilience of natural systems to absorb these pressures, the risks to landscape identity if thresholds of change are exceeded, and, in this event, the capacity for the system to re-assemble into productive natural and social systems.

Three distinct, yet overlapping, projects are proposed under Regional Environments, to address the key challenges in contemporary regional natural resource management.

The Centre for Environmental Management has a long record of research provision to agencies across the region in the area of Ecosystem Restoration. The CEM has conducted ecological research across Victoria, SA and NSW and developed a program to purchase, manage and undertake research on the restoration of the University's Nanya Research station, north of Wentworth, NSW. Complementing the terrestrial ecology strengths of the CEM is the emerging environmental change laboratory that provides research capacity on climate change and wetland condition assessment. The leader of this group (CI Gell) has successfully applied for 16 category 1 grants as first CI since 2002, totalling \$1.6M of research funds. This capacity is complemented with the hydrogeology expertise of Dahlhaus, GIS skills of Graz and the experience of Dowling in quantifying chronic levels of industrial metals. The identified collaborators provide research capacity in the areas of carbon accounting, agroforestry economics, climate change modelling, climate change risk assessment, ostracod palaeolimnology, environmental flows and landscape stability assessment.

## **Research Program 2: Regional Enterprise**

The future of regional communities depends on their management of resources, institutions, social and economic capital, and their ability to innovate and adapt to changes in their environment. Regional Enterprise assesses how these factors influence the growth and structure of populations, the economy, social well-being and adaptive capacity. The program encompasses three projects which examine these relationships. The projects chosen build on current regional policy priorities of national, state and local government and CRIC's previous work in these fields. The three project areas are:

- Enterprise and Innovation
- Population, demography and human capital
- Adaptive capacity of regional economies and communities

## **Background**

The populations and economies of regional Australia have, over the last fifty years, grown at a slower rate than the national average, and in some cases have declined absolutely. Changes in lifestyle, the industrialisation of agriculture, resource depletion, extreme natural events and a lack of agglomeration economies have fostered relative decline in many regional areas. Table 1 below illustrates how regional areas have progressed more slowly and are possibly more disadvantaged compared to metropolitan locations.

**Table 1 – Leading indicators of Metropolitan and regional Australia**

	Metropolitan areas	Regional areas
<b>Population</b>		
1976	62.0%	38.0%
2006	63.6%	36.4%
<i>Compound annual growth rate ('76-'06)</i>	<i>1.39% p.a.</i>	<i>1.15% p.a.</i>
<b>Age distribution (% of total population by area): 2006</b>		
20-39 years	29.7%	24.0%
40 and over	44.1%	48.5%
<b>Income (\$): 2006</b>		
Average weekly individual income	701	647
<b>Employment: 2006</b>		
Unemployment rate	4.91%	5.88%
<b>Communications</b>		
Broadband connection	35.0%	29.0%
Transport (\$ spent per head per week)	132.8	147.7
<b>SEIFA ( Socio-Economic Indexes for Areas): the higher the better</b>		
	1082	939

Whilst on average, regional Australia has been in relative decline, some locations have grown significantly. Government policy, shifts in terms of trade, new communications technologies and the phenomenon of external scale economies creating micro ‘clusters’ of innovative and competitive practice, have led to the successful and sustainable growth of some regional towns and communities.

Regional towns and communities exist in a complex system where future states depend on history, path dependencies, resources and their management. However in an increasingly knowledge based economy these communities can overcome disadvantage in fixed endowments if the system can adapt to rapidly changing environments. Hence many mining communities have short term economic wealth but are not sustainable whilst other successful regional centres no longer rely on their initial natural resource endowments and instead are sustained by intangible knowledge resources and clusters of new enterprises. The Victorian State government’s cluster program is based on this assumption.

Policy development to support a growing and dynamic future for regional communities requires rigorous evidence-based research on how the complex system works, what are the critical relationships between the management of resources, capital and institutions and future outcomes, and how successful adaptation can be achieved. The scope of three strategic and complementary project areas is outlined in Table 2 with a roll-out of sub-projects over a five year period. In most of these areas, some funded research is already in place and will form the basis for the new projects and their future funding. The emerging research outcomes and the social and economic data collected through the longitudinal panel surveys will be displayed as part of a GIS system, will be published in leading journals and will form the basis of an on-going dialogue with governments and communities reviewing what works and what doesn’t work in achieving sustainable regional development.

**Table 2. Five year Regional Enterprise project areas (2009-2014)**

<b>Enterprise and innovation</b>	<b>Population, demography and human capital</b>	<b>Adaptive capacity in regional settings</b>
1. The nature of the regional enterprise: An examination of 'fit' and enterprise strategy	1. Determinants of population change in regional locations	1. Improving regional health provision through ICT enabled medical services
2. The role of social enterprise and third sector organisations in the economic development of regional economies	2. Regional growth, local labour markets and the supply of skilled labour in regional Australia	2. The effects of demand management on domestic water use in regional communities
3. The diffusion of University research into regional innovation systems	3. Economic opportunity, social well-being and youth migration in regional communities	3. The adoption and diffusion of environmental and resource innovation in regional Australia
4. Resource costs, environmental pressure and innovation in regional enterprises	4. ICT and the development of greater participation by women in regional skills labour markets	4. Climate change, carbon trading and innovation in regional farming enterprises

## **Regional Enterprise – Research Projects**

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Regional Enterprise focuses on enterprise development, population change and human capital, and the capacity of communities and economies to adapt to exogenous and endogenous shifts.

### **Research project 2a: Enterprise and Innovation**

#### Aim and Objective

Under the enterprise development project area, the program examines how economic and social wealth is created in regional communities. Here, three important research questions are addressed:

- How do regional enterprises create wealth and social well-being when they lack scale economies or access to an effective regional production or innovation system?
- What is the impact of University research on regional innovation systems?
- What drives innovation in resource constrained and thin knowledge markets and how do regional enterprises respond to the need for increased sustainability in resource use?
- What role do social enterprises and third sector institutions play in directly creating economic value and indirectly supporting economic wealth creation and social well-being?

The central theme of Research project 2a is the way in which enterprise and innovation create new social and economic wealth and hence contribute to the future of regional communities. The units of analysis are the commercial and social enterprises that create wealth, jobs and social goods and services. Regional social and commercial enterprises may have distinctive features because their selection environments maybe different to those of enterprises operating in metropolitan areas.

#### Significance and Innovation

Most regional communities can only exist if there are businesses that create wealth and there are social enterprises and non-profits that create the social capital in a community to support the wealth creation process. . Regional enterprises may be disadvantaged by their location but have adapted and survived. For regional business enterprises the selection environment is often, in the non-farm sector, dominated by low population density of firms and small local product and labour markets and this has led to the evolution of specific types of regional enterprises that ‘fit’ with their regional environment (Lowe and Henson, 2006; Armington and Acs 2004). For social enterprises, the thinness of labour and resource markets is also present, but the inadequacy of other public and private provision creates an important regional imperative for social enterprises to both create social goods where the market ‘fails’, and to promote civic participation in local governance and provide legitimate avenues for volunteering. These are critical policy issues and CRIC and other regional researchers have attracted significant funds to examine both of these areas from a policy perspective. The aim of this research program is to develop and underpin this work with a broader regional database and collect reliable longitudinal data through a process of rigorous and longer term research.

#### Activities

Over the next five years the enterprise and innovation project will:

- Engage in a qualitative research program, working with a group of regional SMEs to understand how, over time, they have adapted to their environment by pursuing distinctive strategies and developing systems and relationships that fit with their environment. This qualitative work will be supported by a comparative examination of entrepreneurial

- Using a sample of Victorian non- profit organisations with attached social enterprises, project 2a will examine the processes and resources that sustain these organisations. This work will be supported by data provided by the Victorian Department of Planning and Community Development with whom we have worked extensively in the past on projects concerned with neighbourhood renewal, social enterprises, and adult and community further education (ACFE) organisations. With the exception of the work of Zapalla and Lyons (2006) there is little Australian research on how these organisations are formed and sustained over time. This project would lead into the important research question of what is the economic impact of this sector on regional communities. Jessie Harman will lead this strand. Professor John Martin of La Trobe University, Bendigo will be the external collaborator.
- This research project also includes an examination of innovation diffusion in regional settings. Here the project will work off the current AusIndustry SmartGreen program and a new DPI funded study of innovation and carbon policy to examine how resource and environmental pressures catalyse innovation and discovery processes in farm and non-farm enterprises. Patrice Braun and Jerry Courvisanos will lead this strand. Professor George Wright of Durham University will be the external collaborator.

### Outcomes and future funding

- Application for ARC Linkage grant (2010 onwards)
- Three level A or B publications per annum
- Improved professional practice using research findings disseminated through industry forums and the establishment of a Sustainability lab along the lines of that pioneered at MIT
- Expanded post-graduate cohort particularly in Social Enterprise
- Established linkages with international, national and regional institutions
- Consolidation and development of linkages with international experts

## **Research project 2b: Population and Human capital**

### Aim and Objective

Under the Population and Human Capital project area, the project examines the determinants of population change and structure in regional Australia. Here, three important research questions are addressed:

- What is the likely future structure of regional populations where fertility, migration and, to a lesser extent, death rates respond to economic, environmental and social change?
- Why are regional locations losing their young people at an increasing rate and what determines the attraction and retention of young people?
- Do population movements affect the nature of regional skills labour markets and do ‘thin’ labour markets reduce regional competitiveness?

### Significance and Innovation

Population in regional areas is either declining, or growing at a slower rate than in metropolitan areas, and is also ageing, Nevertheless, regional areas have higher fertility rates than the rest of Australia, and whilst many young people leave regional locations for the cities, there are significant numbers of returnees who come back to regional towns after study, training or for family reasons.

Population change is complex but there are a number of established relationships that determine the three constituent parts of population change – fertility and birth rates, ageing and death rates, and migration. Whilst fertility is relatively high in regional Australia, birth rates are less than the national average because of the skewed age structure of the population. There are significant differences in growth between regional locations; there seems a threshold that determines whether future populations will grow or decline. Population change is determined by a number of structural factors – age, education, income per head, employment availability, but also by other factors like social norms, the changing role of men in the family and the provision of child care, tax credits and other incentives for having children. Some of these factors can be impacted by policy measures, and this project aims to assess how governments and communities can manage the growth and structure of their populations.

### Activities

Over the next three years the Population and Human capital project will:

- Examine large historical data sets to examine the changing relationships in population growth and structure in regional Australia. An integrated multivariate model will be used to model, fertility, migration and morbidity. This will be supplemented by qualitative research that examines how happiness and well-being influence decision making at an individual level. The project will be underpinned by the innovative methodologies developed by CRIC in their work on predicted, experienced and remembered utility. Julian Lowe and Ti-Ching Peng will lead this work and will be supported by Professor Graham Hugo of Adelaide University as the external collaborator
- Undertake a qualitative program of research to establish why there is significant variation in youth migration into and out of regional areas and why some areas are able to attract back leavers more successfully than others. The second part of this study tracks the role that returnees and stayers have in regional communities, and whether the process of leaving and returning significantly enhances human capital and community contribution. Imogen Schwarz will lead this project which builds on existing work with the Victorian Dept. of Community Planning.
- The final study in this area builds on the work of labour skills' studies undertaken by the research team in Western Victoria. The study examines two dimensions of skills markets; 1. the supply of skilled occupations in a regional area, and sources of skills that are under-represented in the labour force, for example women (EOWA, 2006); and 2. the quality of skills that enable local enterprises and organisations to compete in national and international markets. This research examines mobility of skilled labour, variations in wage rates and personal development opportunities and targeted education in regional labour markets, and how under-represented segments of the population can be encouraged to participate qualitatively and quantitatively in the workforce. Patrice Braun will lead this work and the external collaborator will be Professor Peter Sloane of the University of Wales and Visiting Professor at the University of Melbourne.

### Outcomes and future funding

- Application for ARC Linkage grant (2010 onwards)
- Three level A or B publications per annum
- Co-funded research and policy Centre with the Department of Community Planning
- Co-funded research centre with International Taskforce for Women and Technology
- Expanded post-graduate cohort
- Established linkages with international, national and regional institutions Established linkages with international experts including APEC and the United Nations Alliance for ICT and Women

- Established and improved linkages with government policy units concerned with population growth and change

## **Research project 2c: Adaptive capacity in regional settings**

### Aim and Objective

The third research area deals with adaptive capacity and adaptation in the face of significant, exogenous change. We know that in complex systems adaptation and change are often a response to hardship or surplus, but we know less about how that process of adaptation occurs. There are three research questions that drive this research agenda.

- Using water shortages and drought as an example of exogenous pressure in the complex regional system, how does effective demand management occur where the market generates only weak signals?
- How and to what extent can agriculture take advantage of or adapt to the carbon economy?

The other question examines supply side issues in health, and particularly how new technology enables broader scope of provision of health care to regional areas.

- How does information technology change the economics of health care provision, and how does the social diffusion of knowledge and practice accelerate adaptation in regional locations?

### Significance and Innovation

Complex systems naturally adapt to change. This is particularly the case where human interaction is involved. Adaptation and adaptive capacity are central to many resource allocation and community management questions at a regional, national and global level. The potential for adaptation comes from the decision making processes and heuristics used by individuals, communities and governance bodies and its speed is enhanced where there are clear market signals that trigger action. The problem is that sometimes these market signals are strong, and changing benefit-cost scenarios are seen and responded to by actors and groups operating in their own self interest. Sometimes the problem is not perceived and over time a community slides towards an acceptance of poorer outcomes. And sometimes the signals are weak because of long term unseen effects or a distribution of property rights where all costs and benefits of using a system or resource are not borne by the same person. We know that adaptation is naturally occurring and that some adaptation is driven by innovation, and at an enterprise level the project will examine how innovation in sustainability outcomes is generated in the farm and non-farm enterprise.

Governments and communities attempt to guess future adaptation requirements and consultative forums try to predict the future and put in place mitigation measures in advance of an event occurring. However most change occurs through individuals and groups and it is at this level that the project seeks to measure the adaptive capacity of a region or community. This is the most challenging and possibly the most valuable research area. This project manages it by looking at adaptation in three settings; water demand management, the responses of business firms in the farm and non- farm sectors to increasing resource costs, carbon emissions and controls , and the development of ICT enabled health services in regional and previously disadvantaged regions.

### Activities

Over the next three years the adaptive capacity project will

- Build on the existing work the research team have undertaken with Central Highlands Water and Grampians Wimmera Mallee water to develop and test an extended model of Demand Management approaches in the conservation of water resources. The project will use the Theory of Planned Behaviour that underpins its collaborative and ARC funded work with LaTrobe University and Colliban Water, and also forms the basis of its future work with CIAO on the federally funded 'Solar Cities' project. The project also draws on its partnership with BREAZE, a successful activist group in Ballarat. Jessie Harman will be the lead investigator on this project and Brad Jorgensen of LaTrobe University will be the lead collaborator.
- Working closely with part of project 2a concerned with innovation for sustainability, this project will examine the response of a sample of farm enterprises to the emerging carbon controls and carbon trading scheme. This project will work alongside the DPI funded research undertaken by WIDCORP and will be lead by Pam McRae-Williams. The lead collaborators will be Professor George Wright of Durham University and the existing carbon team at DPI.
- Utilise as a starting point the data generated from the roll-out of the Grampians Rural Health Alliance Network (GRHANet)/Clever Health Program and The South West Alliance of Rural Health (SWARH) initiative program, this research will examine how the intervention of health information and knowledge via Information and Communication Technologies (ICT) affects the delivery of health services in regional locations of Western Victoria and the Western Districts. Specifically, the research will assess whether ICT-enabled access to expertise, social/professional networks and professional development can overcome the problem of isolation and distance, build human capital and career prospects for health professionals in regional and rural areas. Lead investigator: Patrice Braun and Associate Professor Kevin O'Toole (Deakin University) will be the lead collaborator

### Outcomes and future funding

This program has already secured significant future funding for a program to begin later in 2009. In addition the Regional Enterprises strand identifies the following other outcomes

- Application for ARC Linkage grant (2010 onwards)
- Three level A or B publications per annum
- Improved professional practice by working with 'top crop' and other farming groups
- Expanded post-graduate cohort
- Established linkages with international, national and regional institutions including the University of Arizona
- Established linkages with international experts
- Established and improved linkages with industry – particularly DPI and GRDC

