USE OF CATCHMENT SPECIFIC SOCIAL AND ECONOMIC INFORMATION IN MANAGING NATURAL RESOURCES

MEHNAZ AHMED[1], BRENT JACOBS[1] AND JACQUIE TRACEY[1]

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ABSTRACT

Catchment specific economic and social information assists catchment management authorities in natural resource planning and decision making. It gives a context to the natural resource management (NRM) planning and decision making by providing an understanding of the economic and social characteristics in a region and tracks economic and social changes overtime. It also enables analysis of factors that influence a community's competence in undertaking NRM activities. Catchment specific economic and social data is available from the Australian Bureau of Statistics but there are gaps in the availability of this data that may hinder NRM planning and decision making. The aim of this paper is two fold: firstly, it provides a snapshot of the economic and social information of selected catchments in NSW and secondly, it emphasises the need for further data availability that can facilitate NRM planning and decision making at a catchment level.

KEY WORDS

economic, social, data availability, natural resource management, catchment management authorities, decision making.

[1]Catchment and Landscape Capacity and Evaluation Team, NRM Division, Department of Environment and Climate Change

Note: Views expressed in this paper are those of the authors and not of Department of Environment and Climate Change, NSW

1. INTRODUCTION

Natural Resource Management (NRM) is an integrative activity where a number of actors including Catchment Management Authorities (CMAs), farmers and Australian, state and local governments take part in defining the natural environment they plan to develop or re-develop. The Commonwealth and state governments play an important role in coordinating NRM activities across the country. They provide support to the CMAs in developing and implementing targets for NRM; developing and monitoring catchment action plans; capacity building of landholders to address NRM; developing programs to promote behavioural change and community support for NRM. To design and implement these activities, it is essential to understand the social and economic composition of the communities (Byron et al 2004; Morrison et al. 2008). The relevance of social and economic information to NRM is not to ensure that NRM outcomes are achieved but to understand the processes involved in achieving or not achieving the intended NRM outcomes.

Profiling social and economic information on a regional basis provides an understanding of the area and sectors within it. It also informs decision making on the likely uptake of NRM policy initiatives. The management actions identified in planning by CMAs require support of the community for successful implementation. To secure this support, it is vital to understand the social and economic make-up of a community in which NRM actions will be undertaken.

A socioeconomic profile provides baseline information and facilitates tracking social and economic changes over time (Stanely et. al 2004). Presentation of time series data assists in analysing social and economic trends that operate in a region i.e. the changes in industry, population, education, employment etc.

Social and economic information is linked to biophysical issues. Changes in the use and management of natural resources impacts on employment, mobility and income. For example salinity not only reduces the environmental quality but also has economic and social impacts in terms of income and employment losses and out-migration of local population in search of job opportunities.

Conversely, social and economic characteristics shape how natural resources are managed in a region and assist in determination of environmental impacts of decisions on resource use. For example, establishment of a mining site, on one hand, may provide economic benefits and employment opportunities; it may contribute to infrastructure development and there may be cash and in-kind support for community activities etc. However, on the other hand, environmental impacts of mining may increase dust and noise pollution, deterioration of water quality, loss of visual amenity and loss of farming land to mining etc.

The Department of Environment and Climate Change-NSW (DECC-NSW) develops customised catchment specific Socioeconomic Profiles for the CMAs using Australian Bureau of Statistics (ABS) census data. The Socioeconomic Profiles based on 2006 Census data are being developed in consultation with the CMAs.

This paper provides a brief depiction of the social and economic data presented in the catchment specific Socioeconomic Profiles of NSW, which is discussed in Section 2. Further issues in relation to the social and economic data availability are discussed in Section 3. Section 4 concludes the paper and suggests recommendations in relation to the data issues.

2. SNAPSHOT OF SOCIAL AND ECONOMIC DATA OF SELECTED CATCHMENTS IN NSW

Social and economic data are of great relevance to policy makers including government (state, local and Commonwealth Governments), industry groups and regional bodies who seek to understand the underlying factors that enable or constrain NRM efforts. The Socioeconomic Profiles of the catchments in NSW are being developed using data from Population and Housing Census and Agricultural Census. Selected NRM data for 2004-05

and 2006-07 is also presented in the profiles, obtained from the Natural Resource Management Survey which is a biennial collection of natural resource management data.

The Socioeconomic Profiles are based on CMA consultation undertaken in early 2008. Most of the data in the Socioeconomic Profile-2006 is provided at mesh block level, which fits exactly with catchment boundaries. These data are representative of the catchment, where appropriate data at Collection District (CD) and Local Government Area (LGA) level has also been made available. Time series data are provided by LGA level for 1996, 2001 and 2006 censuses.

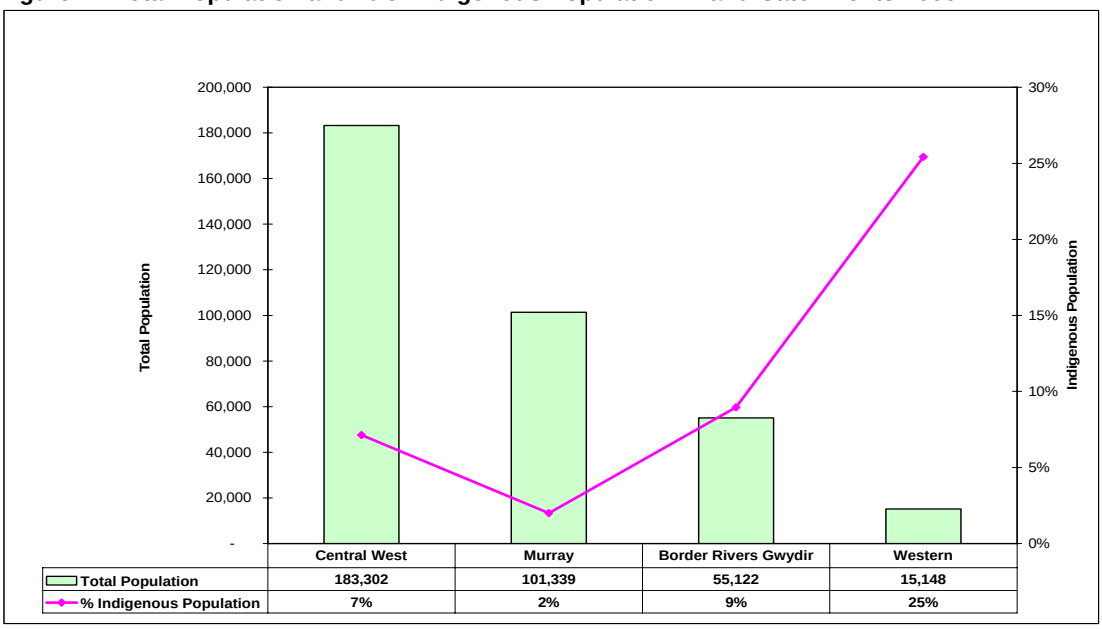
Previous socioeconomic profiles, produced by NSW Department of Natural Resources, provided information on population, education, employment, income, industry and agriculture. In addition, the Socioeconomic Profiles-2006, provide information on internal migration, family and household composition, cultural diversity, internet usage, dwellings and motor vehicles and voluntary work for an organisation.

In the Socioeconomic Profiles, data are mostly provided for the total population and Indigenous population. The Indigenous community is an important stakeholder group in NRM. Natural resources are culturally significant to the Indigenous community (Stanely et. al 2004). It is important to understand social and economic characteristics of the Indigenous communities, which have traditional ties to the land and natural resources.

Following is a brief presentation of social and economic statistics of selected coastal and inland catchments that demonstrates the type of information provided in the profiles. The inland catchments include, Central West, Western, Border Rivers-Gwydir and Murray Catchments, and coastal catchments comprise Northern Rivers, Southern Rivers, Hawkesbury Nepean and Sydney Metro Catchments.

Population: provides information on broad community context, indicates dependency of the population on the natural resource base and provides information on the proportion of the population with potential to engage in NRM activities. Figure 1 provides information on total and Indigenous population in the inland catchments. Of the selected inland catchments population in the Central West Catchment ranked highest. The proportion of Indigenous population to total population was highest in the Western Catchment at 25% and it was lowest in the Murray Catchment at 2%.

Figure 1: Total Population and % of Indigenous Population-Inland Catchments-2006

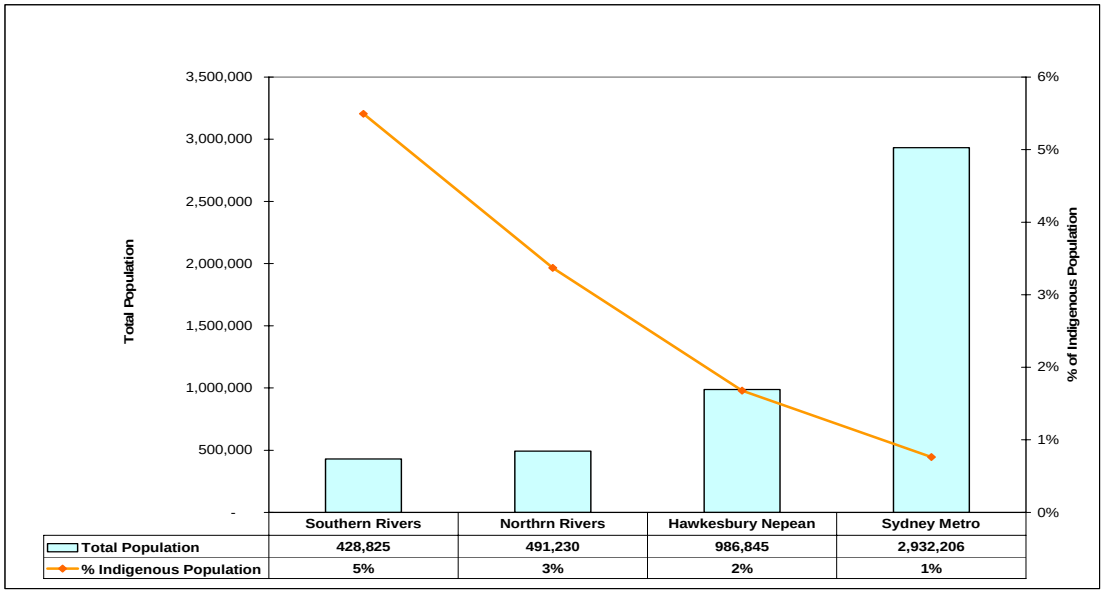


	Central West	Murray	Border Rivers Gwydir	Western
Total Population	183,302	101,339	55,122	15,148
% Indigenous Population	7%	2%	9%	25%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

An interesting trend is observed in the coastal catchments (Figure 2), where total population in the Sydney Metro Catchment ranked highest and lowest level of population was observed in the Southern Rivers Catchment. The proportion of Indigenous population to total catchment population was highest in the Southern Rivers Catchment (5%) and it ranked lowest in the Sydney Metro Catchment (1%).

Figure 2: Total Population and % of Indigenous Population-Coastal Catchments-2006

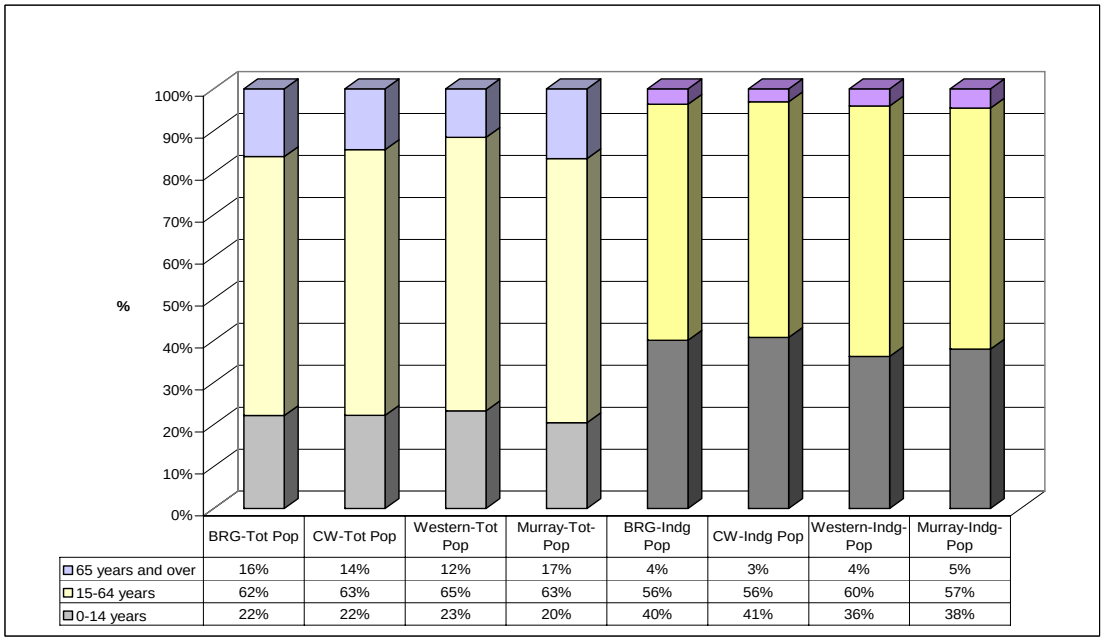


	Southern Rivers	Northrn Rivers	Hawkesbury Nepean	Sydney Metro
Total Population	428,825	491,230	986,845	2,932,206
% Indigenous Population	5%	3%	2%	1%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Age distribution of population shows the availability of potential future workers and dependent population. Figures 3 and 4 provide information on total and Indigenous population by age groups in selected inland and coastal catchments of NSW. A distinctive feature noted in both figures is that a large proportion of the population is in the age group 15-64 years followed by the age group 0-14 years and 65 years and over. Also the proportion of Indigenous population in the age group 0-14 years is higher in comparison to the total catchment population.

Figure 3: Total and Indigenous Population Distribution by Age-Inland Catchments-2006



	BRG-Tot Pop	CW-Tot Pop	Western-Tot Pop	Murray-Tot-Pop	BRG-Indg Pop	CW-Indg Pop	Western-Indg-Pop	Murray-Indg-Pop
65 years and over	16%	14%	12%	17%	4%	3%	4%	5%
15-64 years	62%	63%	65%	63%	56%	56%	60%	57%
0-14 years	22%	22%	23%	20%	40%	41%	36%	38%

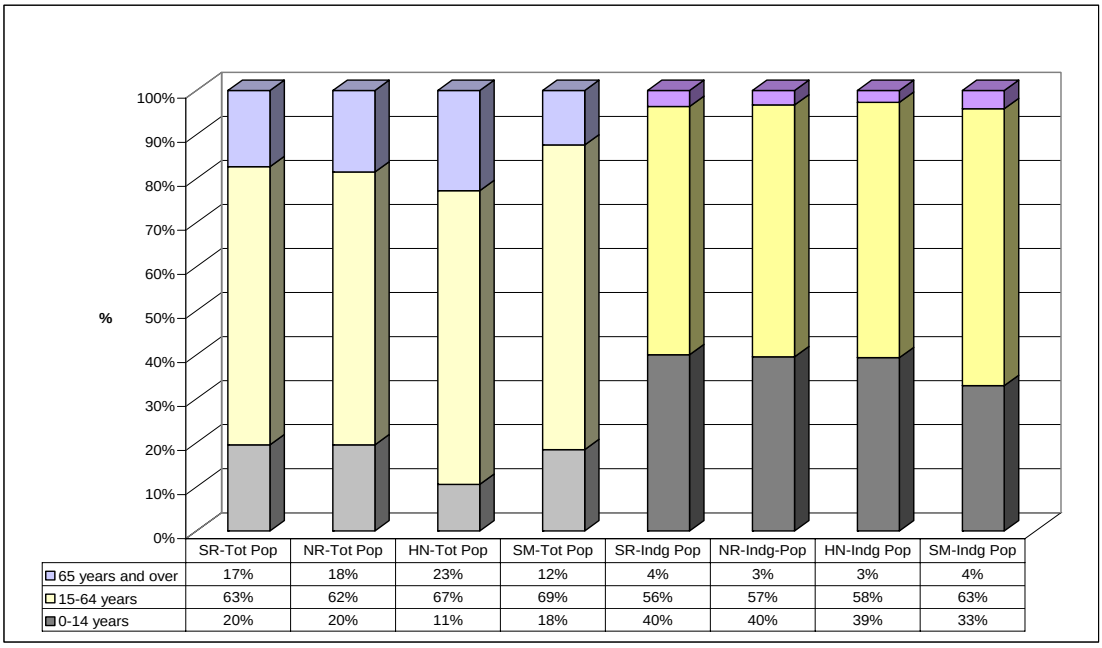
Source: Census of Population and Housing 2006, Australian Bureau of Statistics.
Note:
BRG-Tot Pop= Border Rivers Gwydir Catchment-Total Population
CW-Tot Pop= Central West Catchment-Total Population
Western-Tot Pop= Western Catchment-Total Population

Murray-Tot Pop= Murray Catchment-Total Population
BRG-Indg Pop= Border Rivers Gwydir Catchment-Indigenous Population
CW-Indg Pop= Central West Catchment-Indigenous Population
Western-Indg Pop= Western Catchment-Indigenous Population
Murray-Indg Pop= Murray Catchment-Indigenous Population

In Figure 3, total population of the inland catchments in the age group 15-64 years was approximately in the range of 62% to 65%. In the age group 0-14 years, population ranged from 20% in the Murray Catchment to 23% in the Western Catchment. Similarly in the age group 65 years and over, total population ranged from 12% in the Western Catchment to 17% in the Murray Catchment.

The proportion of Indigenous population by age groups in the Inland Catchments was quite different from the total catchment population estimates. A large proportion of Indigenous population was in the age group 15-64 years and 0-14 years and a small proportion was in the 65 years and older age group. Indigenous population in the age group, 0-14 years ranged from 36% of Indigenous persons in the Western Catchment to 41% in the Central West Catchment. In the age group 15-64 years, the proportion of Indigenous persons ranged from 56% in the Border Rivers Gwydir and the Central West Catchments to 60% in the Western Catchment.

Figure 4: Total and Indigenous Population Distribution by Age-Coastal Catchments-2006



	SR-Tot Pop	NR-Tot Pop	HN-Tot Pop	SM-Tot Pop	SR-Indg Pop	NR-Indg-Pop	HN-Indg Pop	SM-Indg Pop
65 years and over	17%	18%	23%	12%	4%	3%	3%	4%
15-64 years	63%	62%	67%	69%	56%	57%	58%	63%
0-14 years	20%	20%	11%	18%	40%	40%	39%	33%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.
Note:
BRG-Tot Pop= Border Rivers Gwydir Catchment-Total Population
CW-Tot Pop= Central West Catchment-Total Population
Western-Tot Pop= Western Catchment-Total Population
Murray-Tot Pop= Murray Catchment-Total Population
BRG-Indg Pop= Border Rivers Gwydir Catchment-Indigenous Population
CW-Indg Pop= Central West Catchment-Indigenous Population
Western-Indg Pop= Western Catchment-Indigenous Population
Murray-Indg Pop= Murray Catchment-Indigenous Population

Figure 4 provides information on population by age groups in selected coastal catchments of NSW in 2006. It indicates a similar trend as observed in the case of inland catchments with a large proportion of total and Indigenous population in the age bracket 15-64 years followed by 0-14 years and 65 years and older age brackets.

A notable feature in relation to total population is that in the Hawkesbury Nepean Catchment the proportion of 65 years and older population was high in comparison to other catchments at 23% and it had a small proportion 0-14 year population at 11%. The working age population estimates were approximately in the same range in comparison to other NSW catchments.

Indigenous working age population (15-64 years) in the Sydney Metro Catchment was (63%) relatively high in comparison with other catchments, and the proportion of population in the age group 0-14 years was low compared with other catchments at 33%.

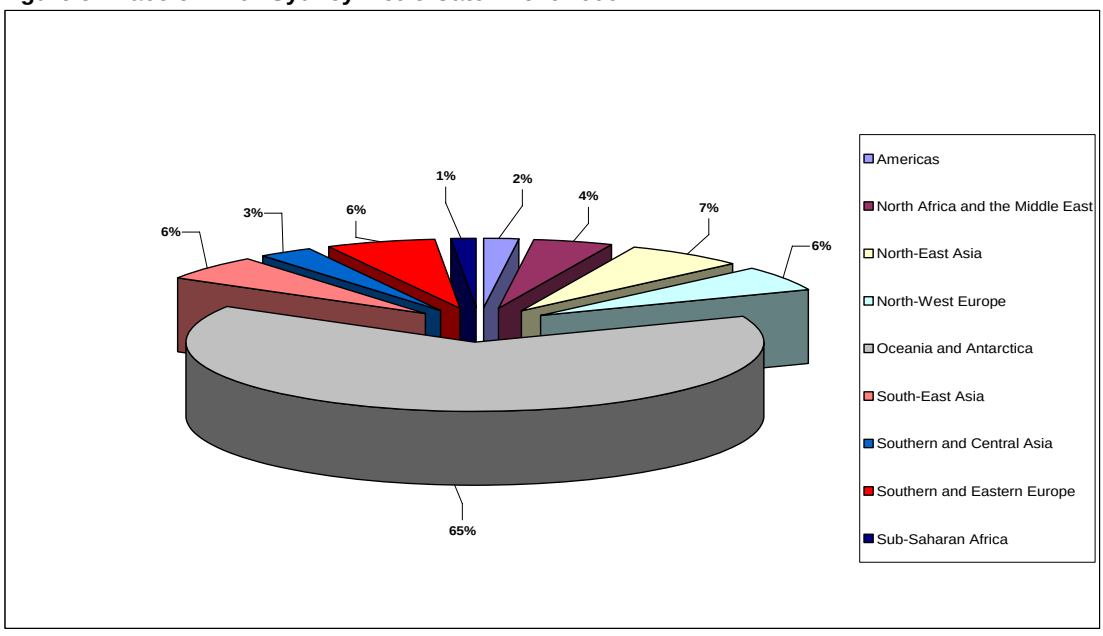
Cultural diversity: examines culturally distinctive groups of people. It can also be described in terms of people with shared identity or similarity based on one or more of a range of factors including but not limited to, a long shared history, cultural tradition, geographic origin, language, literature and/or religion (ABS 1).

Information on ancestry, place of birth and English language proficiency assists in determining the ability to understand and communicate NRM issues. There may be cultural differences in NRM management or farming styles which could be taken into account by CMAs, while planning for the NRM activities. By determining the dominant culture/s in a catchment, CMAs can, for example, develop NRM educational material in languages other than English. Cultural diversity also provides information on the need and type of NRM community engagement activities to be undertaken in a region to recognise diversity. Of the eight coastal and inland catchments selected in this paper results for the most and least culturally diverse catchments are shown in Figures 5 and 6.

Figure 5 provides information on place of birth of persons in the Sydney Metro Catchment, which is known for its cultural diversity and vibrancy. In 2006, the Sydney Metro Catchment had 65% of population from Oceania and Antarctica with the majority being Australians followed by New Zealanders.

Persons from North-East Asia ranked second highest at 7%, mainly with a large proportion of persons from Chinese background, followed by persons from North-West Europe, South-Eastern Europe and South-East Asia at 6% each. In North-West Europe a large proportion of the population was English, in South-East Europe a large proportion of the population was from Italy and in South-East Asia, persons from Vietnam were in majority. Responses from persons in North Africa and Middle East categories accounted for 4%, of which Lebanese persons were in the majority, followed by South and Central Asia at 3%, where the Indian community was dominant.

Figure 5: Place of Birth-Sydney Metro Catchment-2006

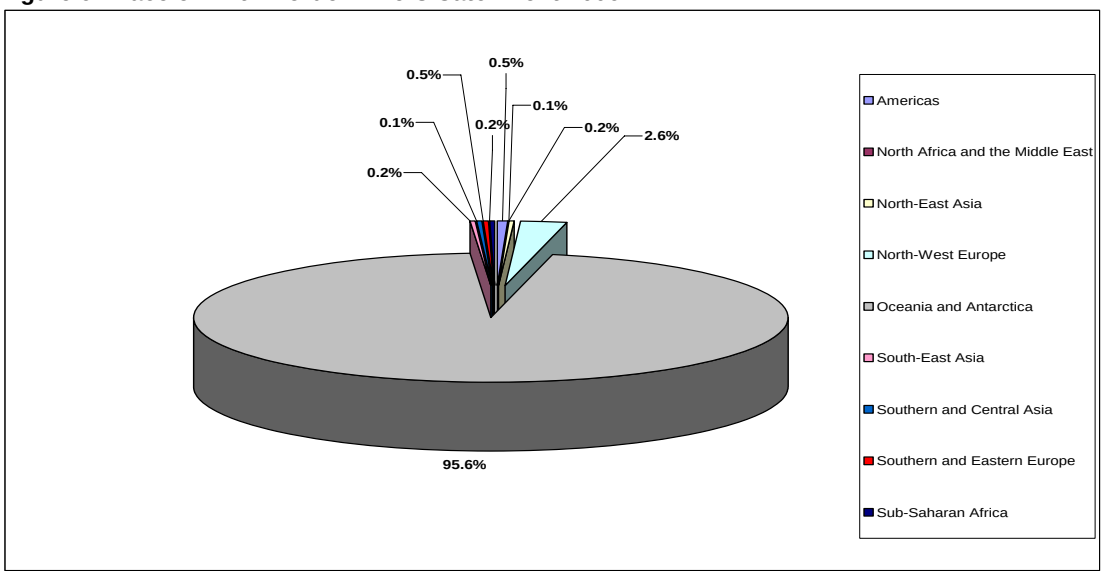


Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Figure 6 provides information on place of birth of persons in the Border Rivers-Gwydir Catchment in 2006, which is the least diverse of the selected catchments. It shows that a large proportion of the persons belonged to Oceania and Antarctica at 95.6%, with a large proportion of these being Australians followed by New Zealanders. Population from North-

West Europe ranked second highest at 2.6% with a majority from an Irish background. For the remaining regions the place of birth of population was less than 1% of total catchment population.

Figure 6: Place of Birth-Border Rivers Catchment-2006

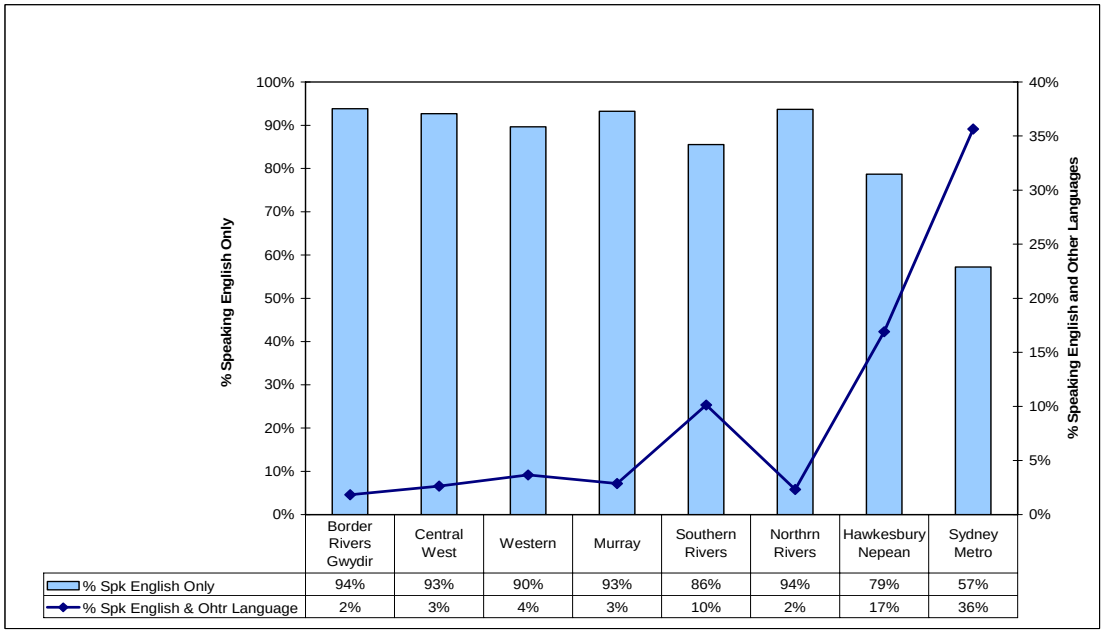


Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Figure 7 provides information on persons speaking English and other languages in selected inland and coastal catchments in 2006. In the inland catchments, persons speaking English language ranged from 90% in the Western Catchment to 94% in the Border Rivers Gwydir Catchment. In coastal catchments, a wide variation was observed of person speaking English language from 57% in the Sydney Metro Catchment to 94% in the Northern Rivers Catchment.

In inland catchments, persons speaking English and other languages ranged from 2% in the Border Rivers-Gwydir Catchment to 4% in the Western Catchment. In coastal catchments, persons speaking English and other languages ranged from 2% in the Northern Rivers Catchment to 36% in the Sydney Metro Catchment.

Figure 7: Percentage of Persons Speaking English and Other Languages-Inland and Coastal Catchments-2006



	Border Rivers Gwydir	Central West	Western	Murray	Southern Rivers	Northrn Rivers	Hawkesbury Nepean	Sydney Metro
% Spk English Only	94%	93%	90%	93%	86%	94%	79%	57%
% Spk English & Ohtr Language	2%	3%	4%	3%	10%	2%	17%	36%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

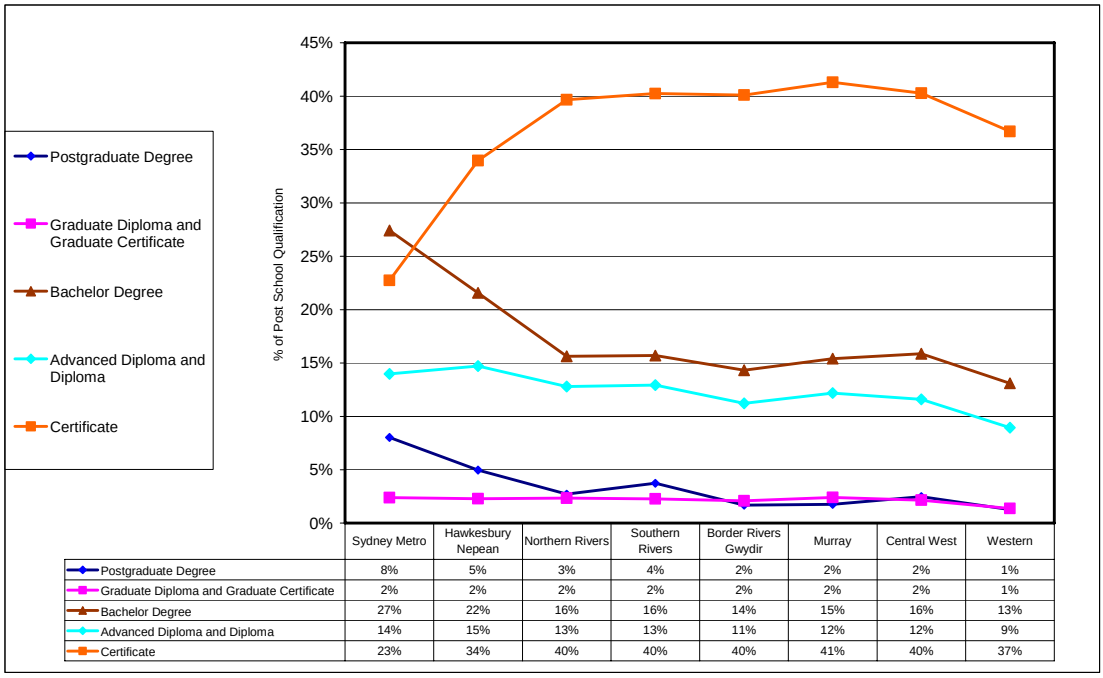
Education: is an indicator of skills, abilities and knowledge in a community. Education increases the ability to comprehend different issues, for example, in an NRM context it can create a better understanding of NRM practices and other environmental issues affecting communities. Higher educational attainment is also associated with higher socioeconomic status.

Figure 8 provides information on type of post school qualification attained by inland and coastal catchments in 2006. It indicates that certificate based education ranked highest in all catchments with exception of the Sydney Metro Catchment. Lowest post school qualification was observed in postgraduate degree and graduate diploma and graduate certificate attainment in all catchments.

Certificate based education across all catchments ranged from 23% in the Sydney Metro Catchment to 41% in the Murray Catchment. Next popular post-school qualification was Bachelor Degree attainment, which ranked highest in the Sydney Metro Catchment at 27% followed by the Hawkesbury Nepean Catchment at 22%. Lowest Bachelor Degree attainment was in the Western Catchment at 13%.

Advanced Diploma and Diploma attainment was highest in the Hawkesbury Nepean Catchment at 14% followed by the Sydney Metro Catchment at 13%. Lowest level of Advanced Diploma attainment was in the Western Catchment at 9%.

Figure 8: Post-School Qualification-Total Population-Inland and Coastal Catchments-2006



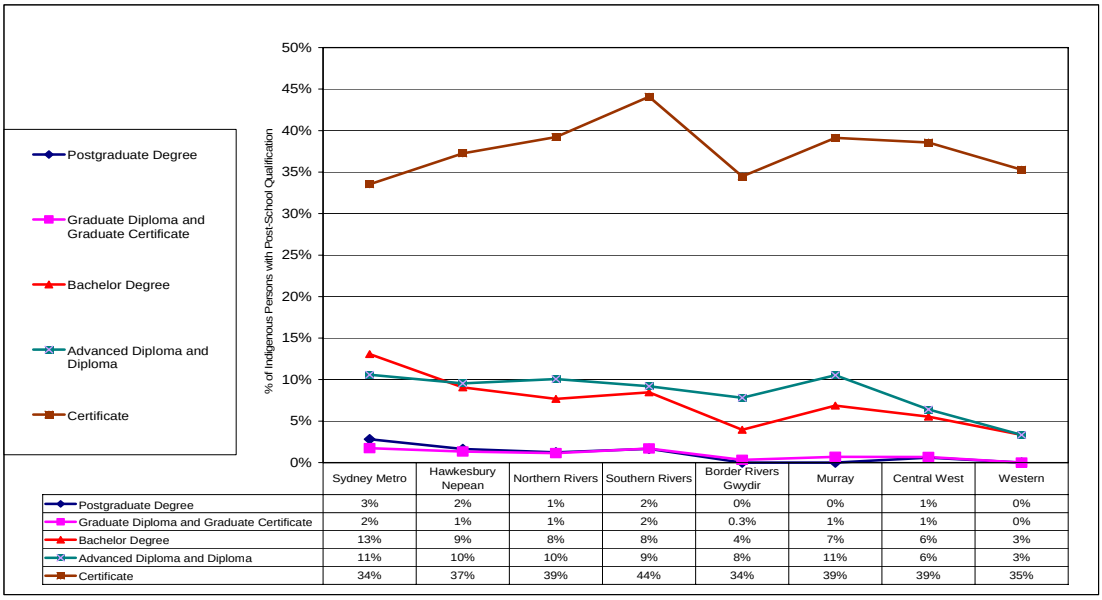
	Sydney Metro	Hawkesbury Nepean	Northern Rivers	Southern Rivers	Border Rivers Gwydir	Murray	Central West	Western
Postgraduate Degree	8%	5%	3%	4%	2%	2%	2%	1%
Graduate Diploma and Graduate Certificate	2%	2%	2%	2%	2%	2%	2%	1%
Bachelor Degree	27%	22%	16%	16%	14%	15%	16%	13%
Advanced Diploma and Diploma	14%	15%	13%	13%	11%	12%	12%	9%
Certificate	23%	34%	40%	40%	40%	41%	40%	37%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Figure 9 shows post school qualification of Indigenous persons in the inland and coastal catchments in 2006. It indicates that the most common post-school qualification was certificate based education and the least common post-school qualification was post graduate degree, as well as, graduate diploma and graduate certificate qualification.

Certificate based education of Indigenous persons ranged from 34% in the Sydney Metro and the Border Rivers Gwydir Catchments to 44% in the Southern Rivers Catchment. Advanced diploma and diploma attainment ranked second highest with exception of the Sydney Metro Catchment. Bachelor degree attainment ranged from 13% in the Sydney Metro Catchment to 3% in the Western Catchment.

Figure 9: Post-School Qualification-Indigenous Persons-Inland and Coastal Catchments-2006

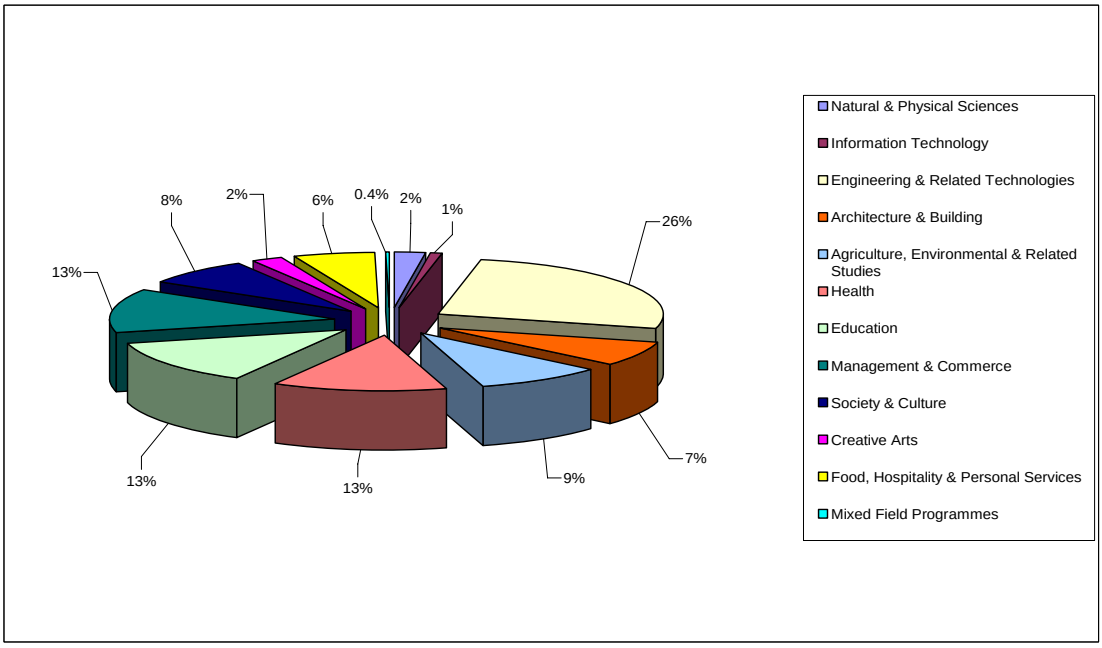


	Sydney Metro	Hawkesbury Nepean	Northern Rivers	Southern Rivers	Border Rivers Gwydir	Murray	Central West	Western
Postgraduate Degree	3%	2%	1%	2%	0%	0%	1%	0%
Graduate Diploma and Graduate Certificate	2%	1%	1%	2%	0.3%	1%	1%	0%
Bachelor Degree	13%	9%	8%	8%	4%	7%	6%	3%
Advanced Diploma and Diploma	11%	10%	10%	9%	8%	11%	6%	3%
Certificate	34%	37%	39%	44%	34%	39%	39%	35%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Figures 10 and 11 provide information for 2006 of post school qualification by field of study in an inland (Western Catchment) and coastal catchment (Hawkesbury Nepean Catchment) respectively.

Figure 10: Post-School Qualification by Field of Study- Western Catchment-2006

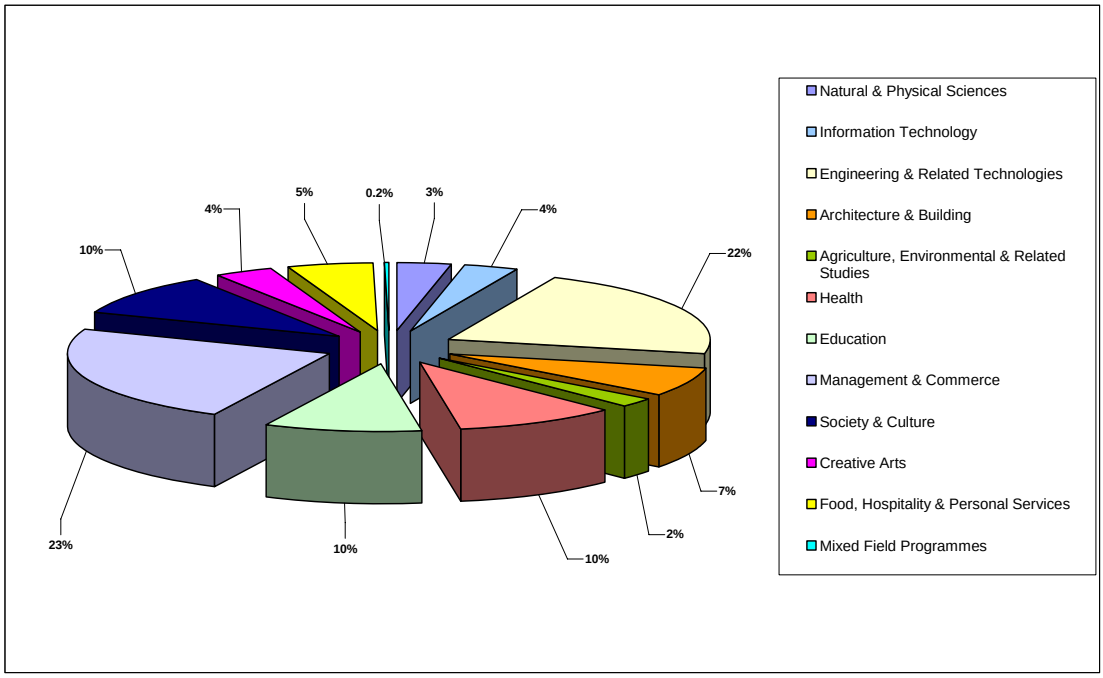


Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

For the Western Catchment (Figure 10), engineering and related technologies ranked highest at 26% followed by management and commerce, health and social assistance and education was at 13% each. NRM related education including, agriculture and environmental related studies accounted for 9% and natural and physical sciences were at 2% of total post school qualification.

For the Hawkesbury Nepean Catchment (Figure 11), the most popular field of study was management and commerce at 23% followed by engineering related technologies at 22%. NRM related fields including, agriculture and environmental related studies accounted for 2% and natural and physical sciences were at 3% of total post school qualification.

Figure 11: Post-School Qualification by Field of Study-Hawkesbury Nepean Catchment-2006



Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

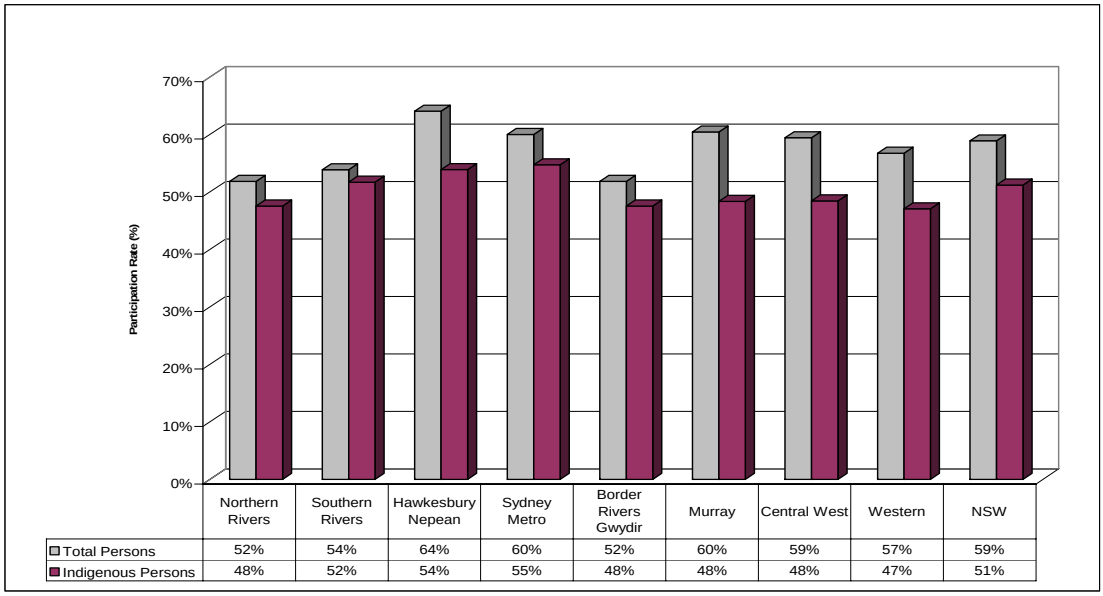
Labour force: is a measure of economic activity. It is commonly defined as the economically active population available for the production of economic goods and services in a given time period (ABS 2). Labour force includes employed and unemployed persons. Labour force statistics enable an understanding of NRM impacts through linkages between employment in agriculture and its flow on impacts on the regional economy. Employment by industry or occupation shows the potential ease with which NRM managers can diversify their employment by shifting to alternative industries and occupations.

Figure 12 provides information on participation rate of total and Indigenous persons in the inland and coastal catchments in 2006. Across the selected catchments, the participation rate of total persons in the Hawkesbury Nepean Catchment was highest among the selected catchments at 64% followed by the Sydney Metro and Murray Catchments at 60% each. Lowest participation rate was observed in the Northern Rivers and the Border Rivers-Gwydir Catchments at 52% each.

The participation rate of total persons was higher than Indigenous persons in all catchments. The difference between the participation rate of total and Indigenous persons was highest in the Murray Catchment where total persons participation rate was 60% compared to 48% participation rate of Indigenous persons.

A comparison of participation rate of Indigenous persons across inland and coastal catchments indicates that a higher participation rate was in coastal catchments compared to inland catchments. It was highest in the Sydney Metro Catchment at 55% followed by the Hawkesbury Nepean Catchment at 54% and it was lowest in the Western Catchment at 47%

Figure 12: Participation Rate-Total and Indigenous Persons-Inland and Coastal Catchments-2006



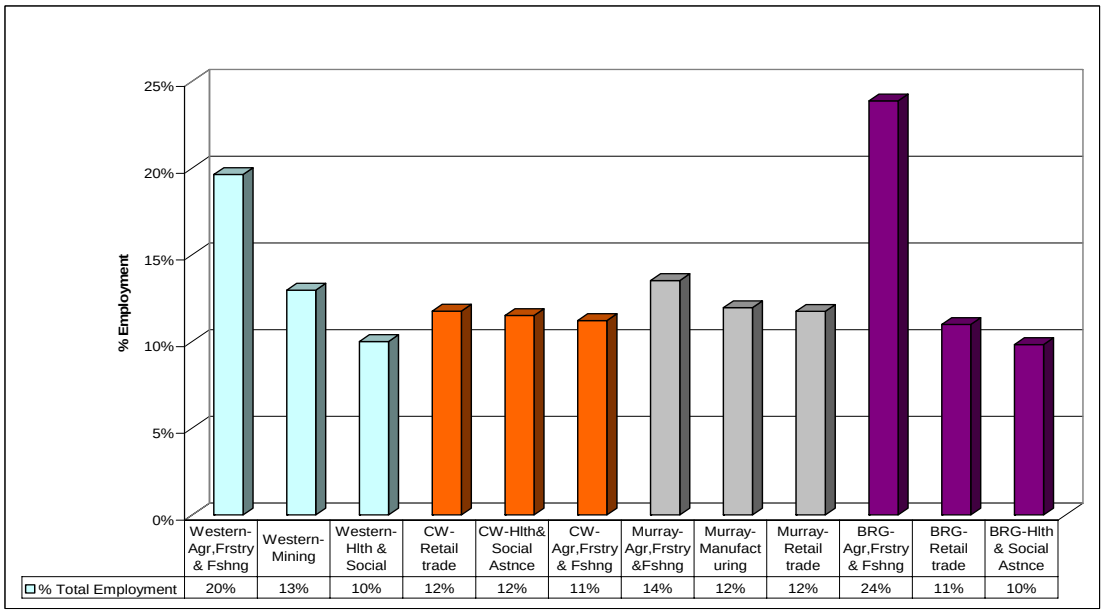
	Northern Rivers	Southern Rivers	Hawkesbury Nepean	Sydney Metro	Border Rivers Gwydir	Murray	Central West	Western	NSW
Total Persons	52%	54%	64%	60%	52%	60%	59%	57%	59%
Indigenous Persons	48%	52%	54%	55%	48%	48%	48%	47%	51%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Figure 13 shows employment by three significant industries in the inland catchments in 2006. Employment in Agriculture based industries was dominant in the inland catchments with exception of the Central West Catchment. The proportion of employment in agriculture, forestry and fishing ranked highest in the Border Rivers-Gwydir Catchment and it constituted 24% of total employment followed by the Western Catchment at 20% and the Murray Catchment at 14%. In the Central West Catchment highest employment was in retail trade and health and social assistance at 12% each, followed by agriculture, forestry and fishing at 11%.

Second and third most significant employment by industry varied in the inland catchments. In the Western Catchment, the mining industry was second highest employer at 13%. In the Murray Catchment, second highest employer was manufacturing industry and retail industry at 12% each and in the Border Rivers Gwydir, it was retail trade at 11%. Third most significant employer in the Western and in the Border Rivers Catchments was health and social assistance sector at 10% each. In the Murray Catchment, third most significant employer was retail trade industry at 12%.

Figure 13: Employment by three Significant Industries- Inland Catchments- 2006



	Western-Agr,Frstry & Fshng	Western-Mining	Western-Hlth & Social	CW-Retail trade	CW-Hlth& Social Astnce	CW-Agr,Frstry & Fshng	Murray-Agr,Frstry &Fshng	Murray-Manufacturing	Murray-Retail trade	BRG-Agr,Frstry & Fshng	BRG-Retail trade	BRG-Hlth & Social Astnce
% Total Employment	20%	13%	10%	12%	12%	11%	14%	12%	12%	24%	11%	10%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

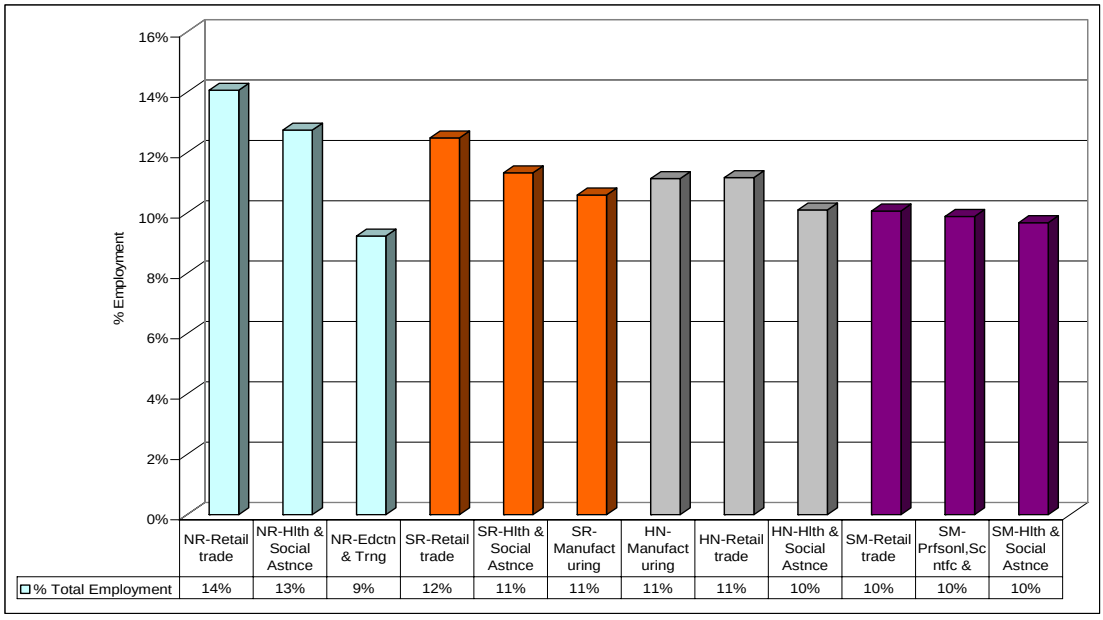
Note:
Western-Agr,Frstry&Fshng = Western Catchment-Agriculture Forestry and Fishing
Western-Mining = Western Catchment-Mining
Western-Hlth&Social = Western Catchment-Health and Social Assistance
CW-Retail trade = Central West Catchment-Retail Trade
CW-Hlth&Social Astnce = Central West Catchment-Health and Social Assistance
CW-Agr,Frstry&Fshng = Central West Catchment- Agriculture Forestry and Fishing
Murray- Ag,Frstry&Fshng = Murray Catchment- Agriculture Forestry and Fishing
Murray-Manufacturing = Murray Catchment-Manufacturing
Murray-Retail trade = Murray Catchment – Retail Trade
BRG- Agr,Frstry&Fshng = Border Rivers Gwydir Catchment -Agriculture Forestry and Fishing
BRG-Retail trade = Border Rivers Gwydir Catchment - Retail Trade
BRG- Hlth&Social Astnce = Border Rivers Gwydir Catchment-Health and Social Assistance

Figure 14 shows employment by three industries in the coastal catchments in 2006. Employment in retail trade ranked highest in all coastal catchments. It ranged from 14% in the Northern Rivers Catchment to 10% in the Sydney Metro Catchment.

In the Sydney Metro Catchment, employment in retail trade, professional and scientific services sector and health and social assistance was at 10% in each sector. In the Hawkesbury Nepean Catchment, employment in retail trade and manufacturing was at 11% in each sector. In Northern Rivers Catchment, employment in retail trade was at 14% and in Southern Rivers it was at 12%

In the Northern Rivers Catchment, second highest employment was in health and social assistance sector at 12% followed by education and training at 9%. In the Southern Rivers Catchment, second highest employment was in health and social assistance and manufacturing industries at 11% each. In the Hawkesbury Nepean Catchment, second highest employment was in health, and social assistance at 9%.

Figure 14: Employment by Three Significant Industries- Coastal Catchments- 2006



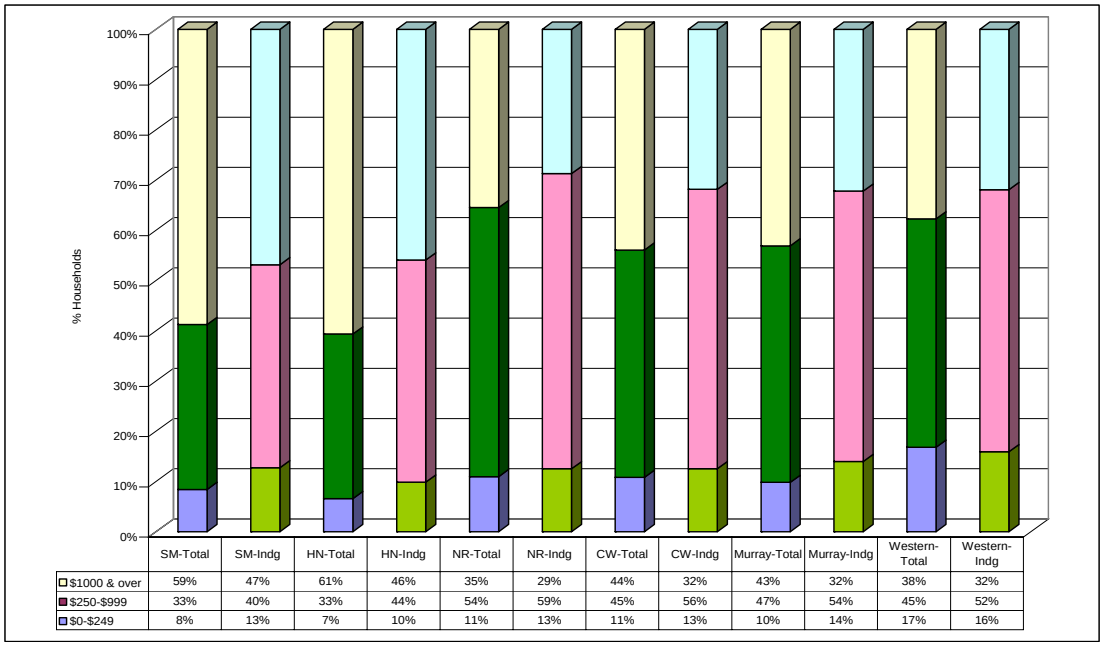
	NR-Retail trade	NR-Hlth & Social Astnce	NR-Edctn & Trng	SR-Retail trade	SR-Hlth & Social Astnce	SR-Manufacturing	HN-Manufacturing	HN-Retail trade	HN-Hlth & Social Astnce	SM-Retail trade	SM-Prfsonl,Scntfc &	SM-Hlth & Social Astnce
% Total Employment	14%	13%	9%	12%	11%	11%	11%	11%	10%	10%	10%	10%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.
Note:
NR-Retail trade- Northern Rivers Catchment -Retail trade
NR- Hlth&Social Astnce = Northern Rivers Catchment - Health and Social Assistance
NR-Edctn&Trng = Northern Rivers Catchment – Education and Training
SR-Retail trade = Southern Rivers Catchment -Retail trade
SR- Hlth&Social Astnce = Southern Rivers Catchment - Health and Social Assistance
SR-Manufacturing = Southern Rivers Catchment-Manufacturing
HN-Manufacturing = Hawkesbury Nepean Catchment-Manufacturing
HN-Retail trade = Hawkesbury Nepean Catchment-Retail trade
HN-Hlth&Social Astnce = Hawkesbury Nepean Catchment -Health and Social Assistance
SM-Retail trade = Sydney Metro Catchment-Retail Trade
SM-Prfsonl,Scntfc & Tchicl Srvcs = Sydney Metro Catchment – Professional, Scientific and Technical Services
SM-Hlth&Social Astnce = Sydney Metro Catchment-Health and Social Assistance

Income: is a measure of economic well being in a community. Income is critical for a community's well being as it influences their ability to participate in NRM activities. High

income communities are considered to be viable as they possess resources to support social and NRM activities. Lack of income is considered to be a constraint for NRM activities.

Table 15: Income by Households-Inland and Coastal Catchments-2006



	SM-Total	SM-Indg	HN-Total	HN-Indg	NR-Total	NR-Indg	CW-Total	CW-Indg	Murray-Total	Murray-Indg	Western-Total	Western-Indg
$1000 & over	59%	47%	61%	46%	35%	29%	44%	32%	43%	32%	38%	32%
$250-$999	33%	40%	33%	44%	54%	59%	45%	56%	47%	54%	45%	52%
$0-$249	8%	13%	7%	10%	11%	13%	11%	13%	10%	14%	17%	16%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Figure 15 shows income by total and Indigenous households in inland and coastal catchments in 2006. A large proportion of total and Indigenous households in the Sydney Metro and Hawkesbury Catchments belonged to income group $1,000 and above. In the remaining catchments, a large proportion of the households belonged to the income group $250-$999 followed by income group $1,000 and above and $0-$249.

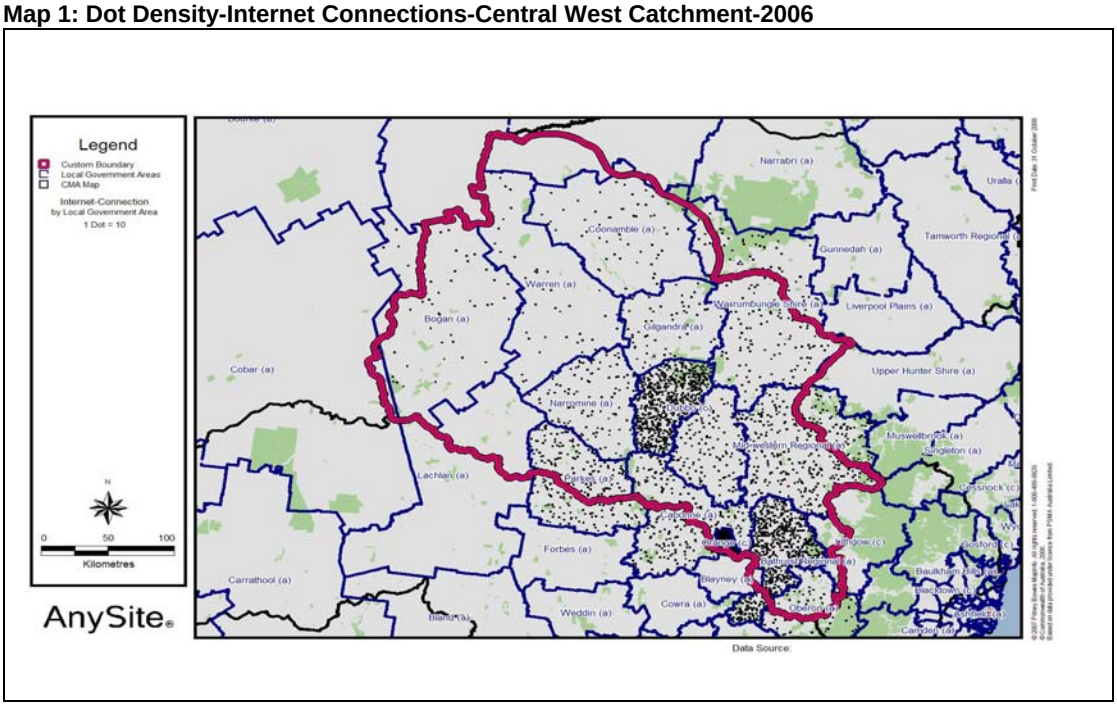
The proportion of Indigenous households in the income group $0-$246 was higher than the total households in all catchments with exception of the Western Catchment. In the income group $249-$999, the proportion of Indigenous households was higher than the total households. However, the proportion of total households in the income group $1,000 and above, were higher than the Indigenous households in all catchments

Total households in the income group $1,000 and above ranged from 38% in the Western Catchment to 61% in the Hawkesbury Catchment. In the income group $250-$999, total households ranged from 33% in the Sydney Metro and Hawkesbury Nepean Catchments to 54% in the Northern Rivers Catchment. Total households in the income groups $0-$249 ranged from 7% in the Hawkesbury Nepean Catchment to 17% in the Western Catchment.

Indigenous households in the income group $1,000 and above ranged from 29% in the Northern Rivers Catchment to 47% in the Sydney Metro Catchment. In the income group $249-$999, Indigenous households ranged from 44% in the Hawkesbury Catchment to 59% in the Northern Rivers Catchment. In the income group $0-$249, Indigenous households ranged from 10% in the Hawkesbury Nepean Catchment to 16% in the Western Catchment.

Internet usage: indicates availability of services to enable NRM communication. Internet usage can assist the communities to work collectively in addressing NRM issues by, for example, forming information exchange groups to share experiences and provide advice. Maps 1 and 2 represent information on density of internet usage in an inland (Central West) and a coastal Catchment (Northern Rivers).

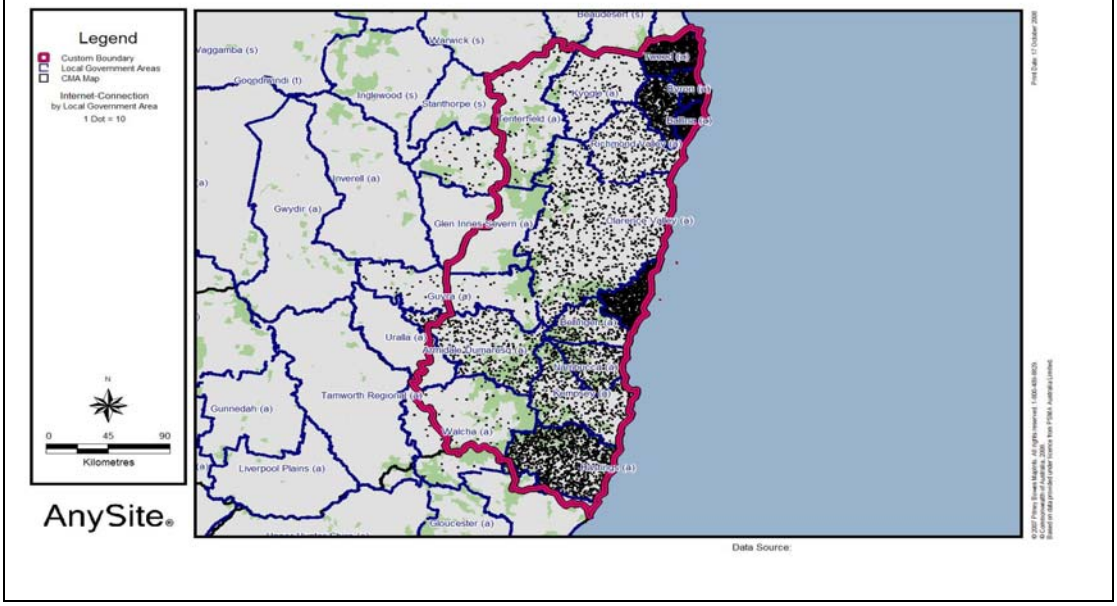
Map 1: Dot Density-Internet Connections-Central West Catchment-2006



Map 1 shows density of internet usage in 2006 in the Central West Catchment. A large proportion of internet connections were mainly in Orange, Dubbo and Bathurst Regional LGAs. In the remaining LGAs the internet usage was widespread but it was not as dense compared to the above mentioned LGAs.

Map 2 shows that a majority of internet connections in the Northern Rivers Catchment were along the coast. A large proportion of the internet connections were in Byron, Tweed, Ballina, Bellingen, Nambucca and Hasting LGAs. In the remaining LGAs the internet usage was widespread and it was not as dense compared to the above mentioned LGAs.

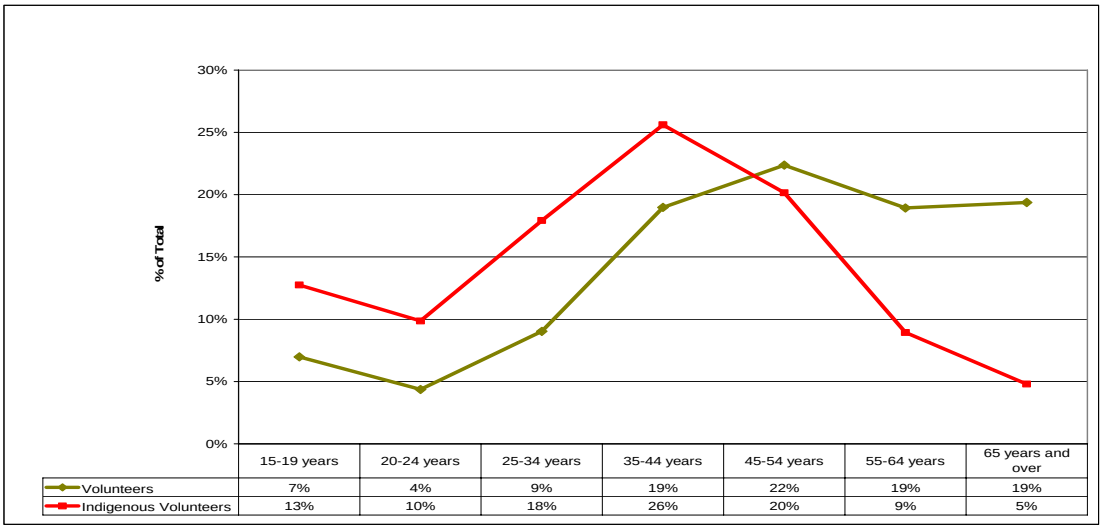
Map 2: Dot Density-Internet Connections-Northern Rivers Catchment-2006



Voluntary work: is unpaid help in the form of time, services or skills to or through an organisation or group (ABS 3). Voluntary work increases prospects of democratic participation, personal development and recreation in a community. It also enables the development and further expansion of social networks and community cohesion.

In NRM context, this information can assist CMAs in understanding of the level of community willingness to participate in its welfare and formulate NRM programs/projects to involve individuals willing to volunteer their time, services or skills for NRM activities accordingly.

Figure 16: Volunteer Work by Age-Northern Rivers Catchment-2006



	15-19 years	20-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65 years and over
Volunteers	7%	4%	9%	19%	22%	19%	19%
Indigenous Volunteers	13%	10%	18%	26%	20%	9%	5%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Figure 16 and 17 presents information on voluntary work by age, in an inland (Western Catchment) and a coastal catchment (Northern Rivers Catchment) in 2006.

Figure 16 shows total and Indigenous volunteers by age groups in the Northern Rivers Catchment in 2006. Total volunteers in the age group 45-54 years and Indigenous volunteers in the age group 35-44 years, ranked highest. Total volunteers in the age group 20-24 years and Indigenous volunteers in the age group 65 years and over, ranked lowest.

Volunteers in the age group 45-54 years, accounted for 22% of total volunteers followed by the age groups 35-44 years, 55-64 years and 65 years and over, at 19% each. In the lowest ranking age group 20-24 years, it was 4%.

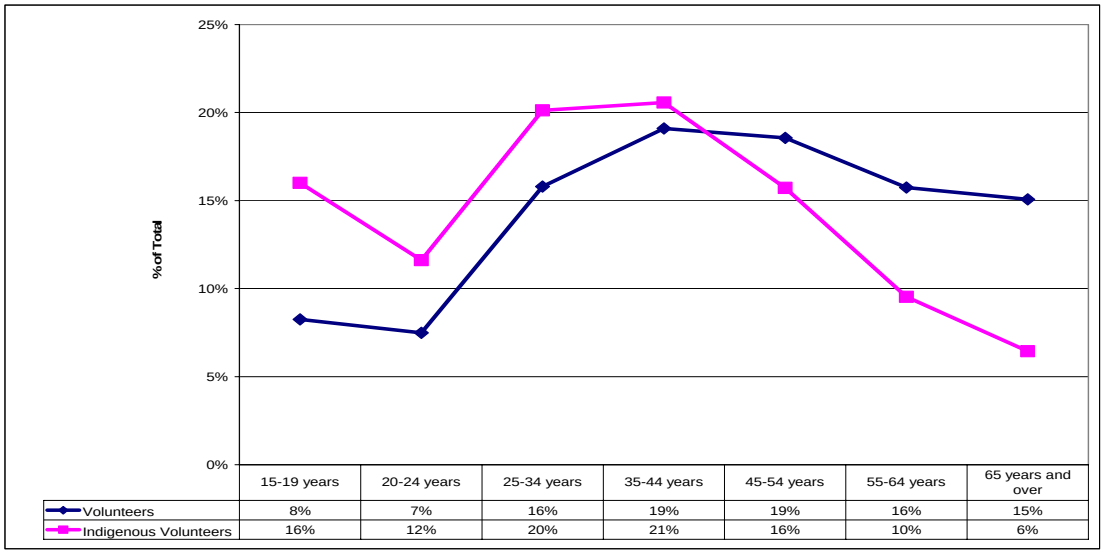
In the Northern Rivers Catchment, Indigenous volunteers in the age group 35-44 years peaked at 26% of total Indigenous volunteers followed by the age group 45-54 years, at 20% and in the age group 25-34 years, Indigenous volunteers were 18%. In the lowest ranking age group, 65 years and over, Indigenous volunteers were 5%.

Figure 17 shows total and Indigenous volunteers by age groups in the Western Catchment in 2006. Total and Indigenous volunteers ranked highest in the age group 35-44 years. Total volunteers in the age group 20-24 years and Indigenous volunteers in the age group 65 years and over, ranked lowest.

In the age groups 35-44 years and 45-54 years, total volunteers accounted for 19% of total volunteers. Second highest volunteering was in the age group 25-35 years and 55-64 years, and each age group accounted for 16% of total volunteers. Volunteers in the age group 20-24 years accounted for 7% of total volunteers.

Indigenous volunteers peaked in the age group 35-44 years, which accounted for 21% of total Indigenous volunteers followed by the age group 25-34 years at 20% and in the age group 15-19 years and 45-54 years Indigenous volunteers were 16% each. Lowest proportion of Indigenous volunteers belonged to the age group 65 years and over at 6%.

Figure 17: Volunteer Work by Age-Western Catchment-2006



	15-19 years	20-24 years	25-34 years	35-44 years	45-54 years	55-64 years	65 years and over
Volunteers	8%	7%	16%	19%	19%	16%	15%
Indigenous Volunteers	16%	12%	20%	21%	16%	10%	6%

Source: Census of Population and Housing 2006, Australian Bureau of Statistics.

Socioeconomic Indexes of Areas (SEIFA): measure the social and economic well being of regions (ABS 4). ABS composes four SEIFA indexes which rank the regions based on social and economic characteristics. Each index provides a general measure of social and economic status of a region under study. The four SEIFA indexes include Index of Relative Socio-economic Disadvantage, Index of Relative Socio-economic Advantage and Disadvantage, Index of Economic Resources and Index of Education and Occupation.

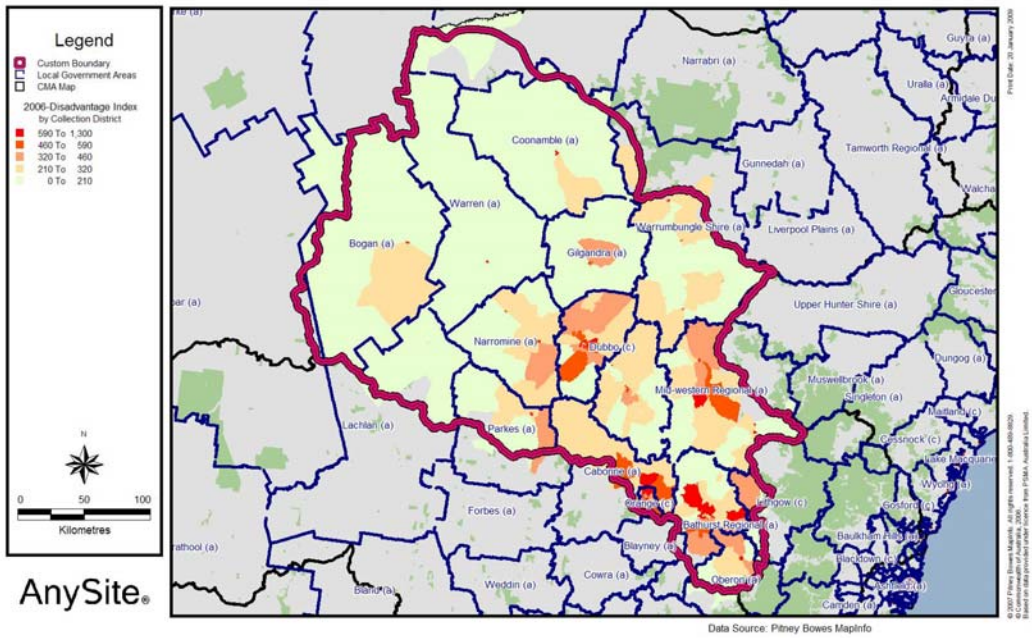
SEIFA indexes provide a broad indication of advantaged and disadvantaged communities. This information can allow CMAs to develop the NRM activities based on the socioeconomic differences within the catchment. A region with low social and economic status will be vulnerable to NRM interventions that reduce its productivity for example, a low income farming community may not be willing to adopt NRM activities that reduce its agricultural production or which require financial investment. The differences in the educational status in the catchment will enable the CMAs to structure NRM educational programs accordingly.

Index of Relative Socioeconomic Disadvantage is discussed in this section. It is derived from Census variables related to disadvantage, such as low income, low educational attainment, unemployment, and dwellings without motor vehicles.

Maps 3 and 4 represent thematic maps of Index of Socioeconomic Disadvantage of an inland (Central West Catchment) and a coastal (Northern Rivers Catchment) catchment.

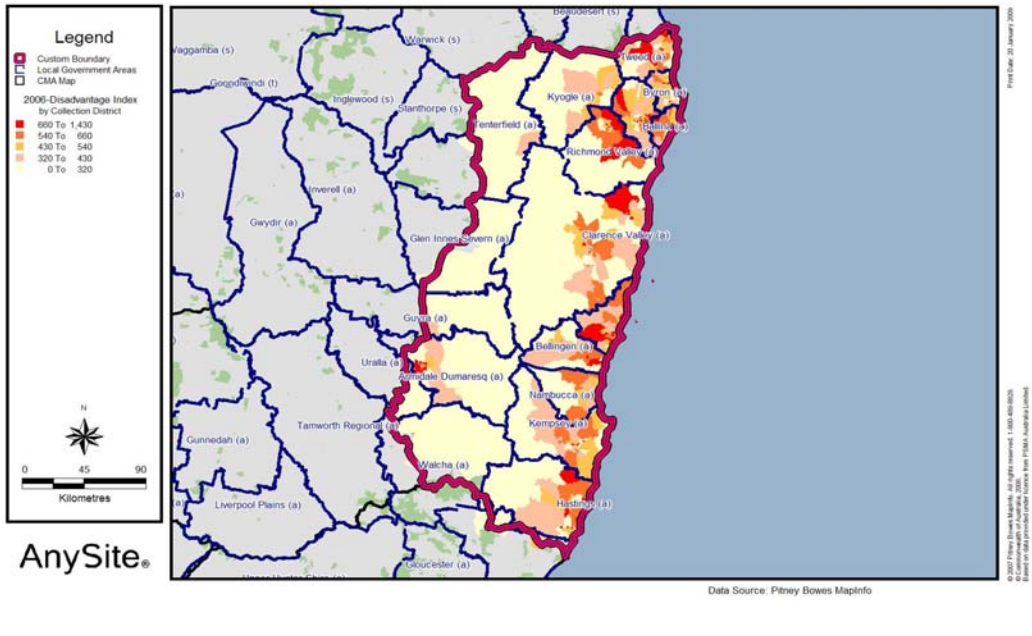
Map 3 shows that the disadvantaged population are dispersed throughout the Central West Catchment. Significant pockets of disadvantage occurred in parts of Bathurst Regional, Cabonne, Orange, Coonamble, Warrumbungle Shire, Bogan and Mid Western Regional LGAs.

Map 3: Thematic Map-Index of Socioeconomic Disadvantage-Central West Catchment-2006



Map 4 indicates that the disadvantaged population is spread out mainly along the coastal LGAs of the Northern Rivers Catchment, particularly in parts of Tweed, Bogan, Clarence Valley, Bellingen and Hastings. In parts of Armidale Dumaresq, the Index of Socioeconomic Disadvantage is high also.

Map 4: Thematic Map-Index of Socioeconomic Disadvantage-Northern Rivers Catchment-2006



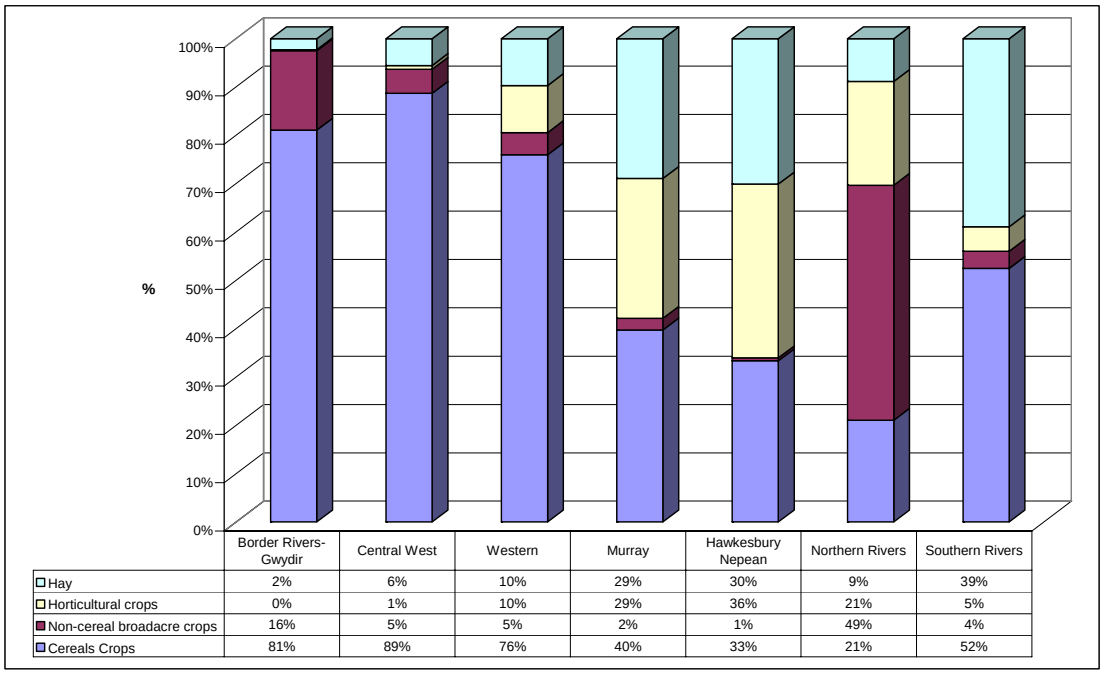
Agriculture: Information on agriculture is obtained from the Agricultural Census 2006. The Agricultural Census collects data on area and production for a wide range of agricultural commodities. The Socioeconomic Profiles of the catchments in NSW provide broad information on land use and ownership, broad acre crops, horticulture, livestock and irrigation. Information on agriculture will enable CMAs to understand the current situation of agriculture in their catchment, link it with the NRM in the region and develop appropriate programs and projects to support agriculture and NRM activities.

Figure 18 shows area under crops and hay of selected inland and coastal catchments in NSW in 2006. In the inland catchments a large area of the crops is dedicated to cereal production. Highest cereal crop production was in the Central West Catchment and it accounted for 89% of total crops and hay production followed by the Border Rivers-Gwydir Catchment, where it constituted 81%. In coastal catchments, the Southern Rivers Catchment dedicated 52% of the area under cereal production followed by the Hawkesbury Nepean Catchment at 33%.

Area under non cereal crops was not extensive in catchments under discussion with the exception of the Northern Rivers Catchment where it accounted for 49% of the total area under crops and hay. Area under hay production was significant in the Southern Rivers (39%), Hawkesbury Nepean (30%) and Murray (29%) Catchments.

Area dedicated to horticulture production was most substantial in coastal catchments. In the Hawkesbury Nepean Catchment it was 36% and 21% in the Northern Rivers Catchment. Horticulture production was not significant in the Southern Rivers Catchment. In the inland catchments, area under horticultural production was only substantial in the Murray Catchment constituting 29% of the total area under crops and hay production followed by the Western Catchment at 10%.

Figure 18: Area Under Crops and Hay-Inland and Coastal Catchments-2006

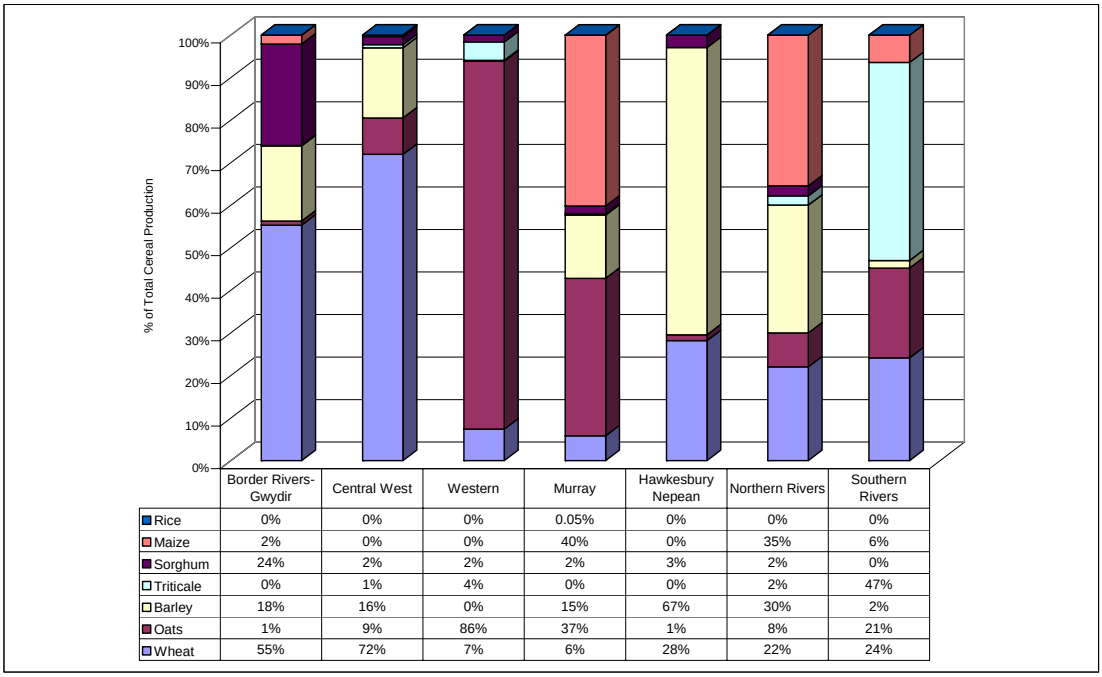


	Border Rivers-Gwydir	Central West	Western	Murray	Hawkesbury Nepean	Northern Rivers	Southern Rivers
Hay	2%	6%	10%	29%	30%	9%	39%
Horticultural crops	0%	1%	10%	29%	36%	21%	5%
Non-cereal broadacre crops	16%	5%	5%	2%	1%	49%	4%
Cereals Crops	81%	89%	76%	40%	33%	21%	52%

Source: Agriculture Census-Australian Bureau of Statistics-2006

Figure 19 shows a breakdown of cereal crop production in selected coastal and inland catchments in 2006. Production of wheat was substantial in all catchments under discussion with exception of the Hawkesbury Nepean Catchment. Production of wheat ranked highest in the Western Catchment at 72% of the total cereal production followed by the Border Rivers Catchment at 55%.

Figure 19: Cereal Crop Production-Inland and Coastal Catchment-2006



	Border Rivers-Gwydir	Central West	Western	Murray	Hawkesbury Nepean	Northern Rivers	Southern Rivers
Rice	0%	0%	0%	0.05%	0%	0%	0%
Maize	2%	0%	0%	40%	0%	35%	6%
Sorghum	24%	2%	2%	2%	3%	2%	0%
Triticale	0%	1%	4%	0%	0%	2%	47%
Barley	18%	16%	0%	15%	67%	30%	2%
Oats	1%	9%	86%	37%	1%	8%	21%
Wheat	55%	72%	7%	6%	28%	22%	24%

Source: Agriculture Census-Australian Bureau of Statistics-2006

Production of oats ranked highest in the Western Catchment at 86% followed by the Murray Catchment at 37%. Production of Barley was highest in the Hawkesbury Nepean Catchment at 67% followed by the Northern Rivers Catchment at 30%.

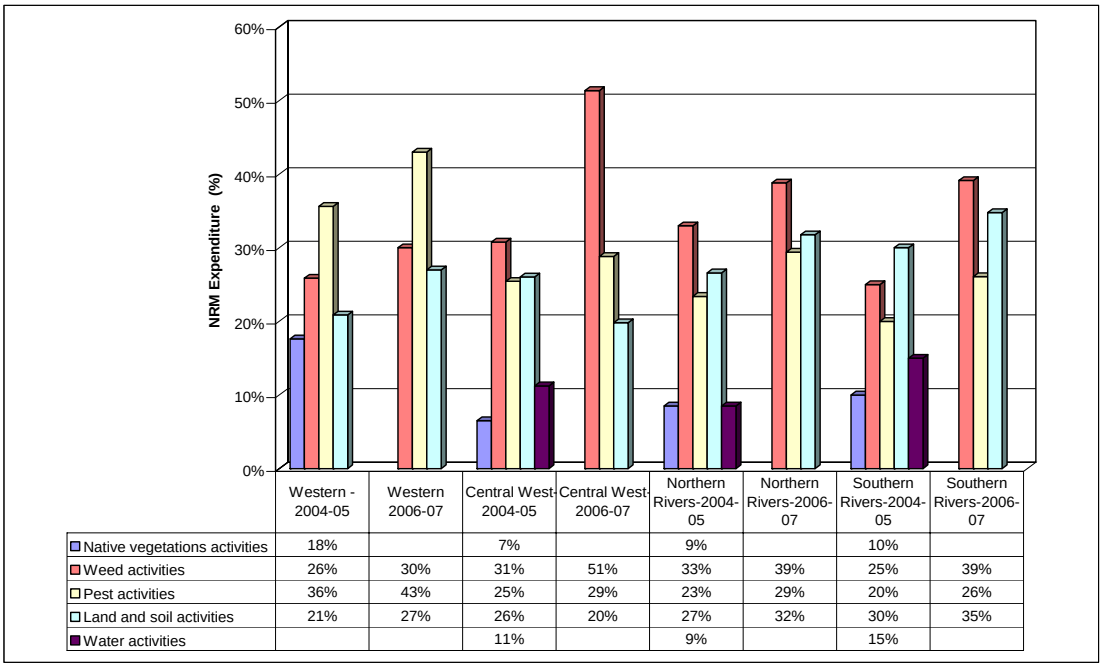
The Southern Rivers Catchment had most significant production of triticale at 47% followed by the Western Rivers Catchment at 4%. Sorghum's production formed a considerably high proportion of cereal crops in the Border Rivers Catchment at 24% followed by the Hawkesbury Nepean Catchment at 3%. Maize production peaked in the Murray Catchment at 40% followed by the Northern Rivers Catchment at 35%. Production of rice in the Murray Catchment was at 0.05 %.

Natural Resource Management: Information on NRM includes following agricultural businesses consisting of nursery and horticulture, mushroom and vegetables production, fruit and tree nut, sheep, beef cattle and grain farming, other crops, dairy cattle farming, poultry farming, deer farming and other livestock farming. The survey provides information on type of weed, pest, and land and soil problems present on their land, and the activities undertaken to prevent or manage them. It also provides details of the costs and effort undertaken in addressing these problems. Many data items in the NRM survey are based on the perceptions and attitudes prevalent in the agricultural businesses and therefore may not tally exactly with data from other sources.

Figure 20 provides a comparison of NRM expenditure of selected inland and coastal catchments in NSW in 2004-05 and 2005-06. In the selected catchments, NRM expenditure increased in all catchments from 2004-05 to 2006-07 with exception of the Central West Catchment in land and soil activities. A large proportion of the NRM expenditure in each catchment was dedicated to pest and weed management activities.

Of the selected inland catchments, in 2004-05, highest NRM expenditure was on weed management in the Central West Catchment which formed 31% of total NRM expenditure and it increased to 51% in 2006-07. In coastal catchments, expenditure on weed management ranked highest in the Northern Rivers at 33% and it increased to 39% in 2006-07.

Figure 20: NRM Expenditure-Inland and Coastal Catchments-2004-05 & 2006-07



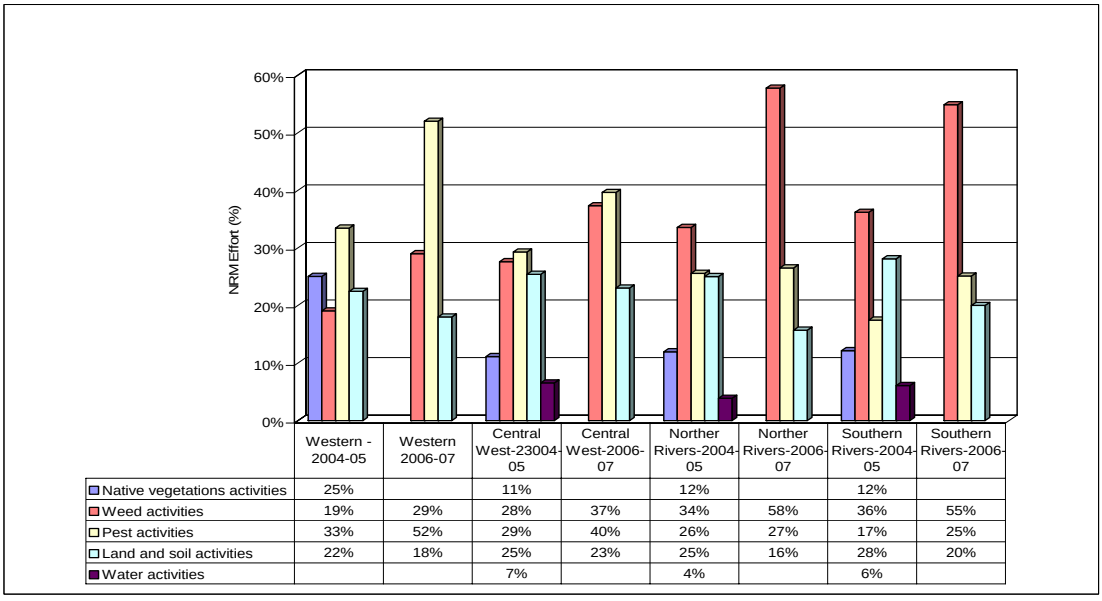
	Western - 2004-05	Western 2006-07	Central West-2004-05	Central West-2006-07	Northern Rivers-2004-05	Northern Rivers-2006-07	Southern Rivers-2004-05	Southern Rivers-2006-07
Native vegetations activities	18%		7%		9%		10%	
Weed activities	26%	30%	31%	51%	33%	39%	25%	39%
Pest activities	36%	43%	25%	29%	23%	29%	20%	26%
Land and soil activities	21%	27%	26%	20%	27%	32%	30%	35%
Water activities			11%		9%		15%	

Source: Natural Resource Management on Australian Farms, Australian Bureau of Statistics, 2004-05, 2006-07

In inland catchments, expenditure on pest activities in the Western Catchment increased from 36% in 2004-05 to 43% in 2006-07. In the Central West Catchment it increased from 25% in 2004-05 to 29% in 2005-06. In coastal catchments, expenditure on pest activities in the Northern Rivers was 23% and it increased to 29% in 2006-07 and in the Southern Rivers Catchment it increased from 20% to 26% during the period under consideration.

During the period of 2004-05 and 2006-07, expenditure on land management activities increased in the Western Catchment from 21% to 27%. In the Central West Catchment, expenditure on land and soil activities decreased from 26% in 2004-05 to 20% in 2006-07. In the Northern Rivers Catchment it increased from 27% to 32% and in the Southern Rivers Catchment it increased form 30% to 35% during the same period.

Figure 21: NRM Effort-Inland and Coastal Catchments-2004-05 & 2006-07



	Western - 2004-05	Western 2006-07	Central West-23004-05	Central West-2006-07	Norther Rivers-2004-05	Norther Rivers-2006-07	Southern Rivers-2004-05	Southern Rivers-2006-07
Native vegetations activities	25%		11%		12%		12%	
Weed activities	19%	29%	28%	37%	34%	58%	36%	55%
Pest activities	33%	52%	29%	40%	26%	27%	17%	25%
Land and soil activities	22%	18%	25%	23%	25%	16%	28%	20%
Water activities			7%		4%		6%	

Source: Natural Resource Management on Australian Farms, Australian Bureau of Statistics, 2004-05, 2006-07

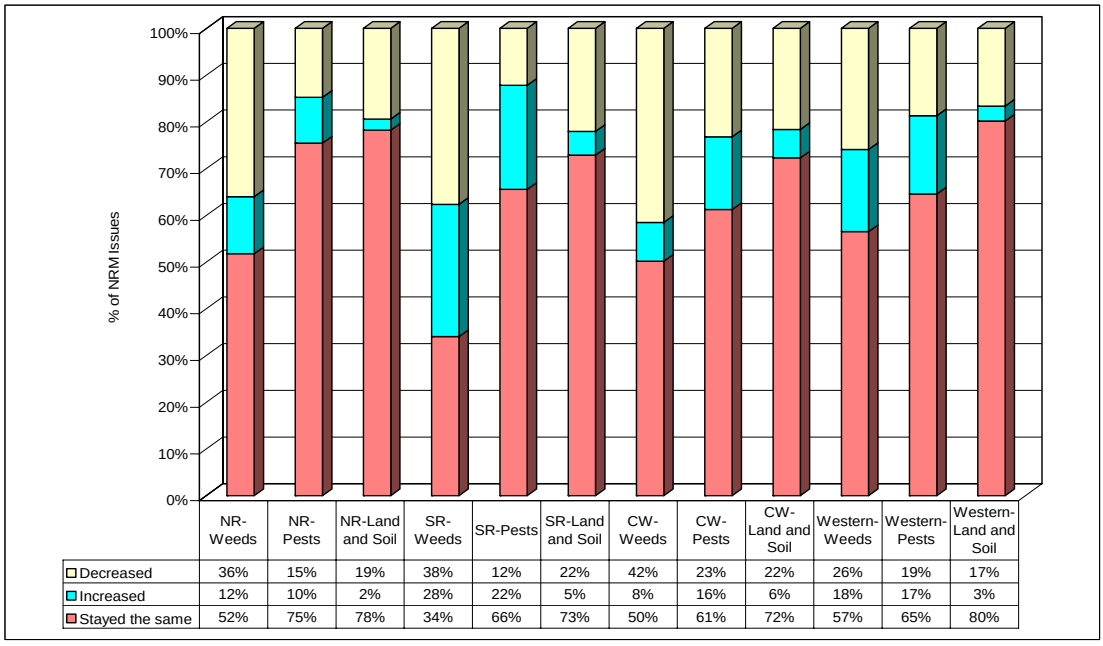
Figure 21 represents NRM effort in selected inland and coastal catchments of NSW in 2004-05 and 2006-07. NRM effort in weed and pest activities increased in selected catchments during 2004-05 and 2005-06 and it declined in land and soil activities during the same period.

In inland and coastal catchments NRM effort increased in pest activities during 2004-05 to 2006-07. In the Northern Rivers it increased from 26% to 27% and in the Southern Rivers it increased from 17% to 25% during the same period. In inland catchments, NRM effort in pest activities in the Western Catchment increased from 33% in 2004-05 to 52% in 2006-07 and it increased from 29% to 40% in the Central West Catchment during the same period.

In weed activities there was an increase in NRM effort in inland catchments and coastal catchments as well. Effort on weed activities in the Western Catchment increased from 19% to 29% during 2004-05 to 2006-07 and in the Central West Catchment it increased from 28% to 37% during the same period. In coastal catchments, NRM effort on weed activities in the Southern Rivers Catchment increased from 36% in 2004-05 to 55% in 2006-07. In the Northern Rivers Catchment it increased from 34% in 2004-05 to 58% in 2006-07.

In land and soil activities, a considerable decline in NRM effort took place in coastal catchments during the period under consideration. In the Northern Rivers Catchment, NRM effort in land and soil activities decreased from 25% in 2004-05 to 16% in 2006-07 and in the Southern Rivers Catchment it fell from 28% to 20% during the same period. In inland catchments, NRM effort in land and soil activities in the Western Catchment decreased from 22% to 18% during 2004-05 and 2006-07. In the Central West Catchment it fell from 25% to 23% during the same period.

Figure 22: Status of NRM Issues-Inland and Coastal Catchments-2006-07



	NR-Weeds	NR-Pests	NR-Land and Soil	SR-Weeds	SR-Pests	SR-Land and Soil	CW-Weeds	CW-Pests	CW-Land and Soil	Western-Weeds	Western-Pests	Western-Land and Soil
Decreased	36%	15%	19%	38%	12%	22%	42%	23%	22%	26%	19%	17%
Increased	12%	10%	2%	28%	22%	5%	8%	16%	6%	18%	17%	3%
Stayed the same	52%	75%	78%	34%	66%	73%	50%	61%	72%	57%	65%	80%

Source: Natural Resource Management on Australian Farms, Australian Bureau of Statistics, 2004-05, 2006-07

Figure 22 provides information on status of NRM issues in selected inland and coastal catchments in 2006-07. A large proportion of farmers in the inland and coastal catchments viewed NRM issues as unchanged in pest and land and soil activities with exception of weed management, where this issue showed progress.

In coastal catchments, weed activities in the Southern Rivers Catchment decreased by a significant proportion at 38%, where as, 28% of the weed issues increased and 34% remained the same. In the Northern Rivers Catchment, 36% of the weed issues decreased, 12% increased and 52% remained the same. In inland catchments, weed activities in the Central West Catchment decreased by 42%, it increased by 8% and it remained the same by

50%. In the Western Catchment, 26% of the weed issues decreased, 18% increased and 57% remained the same.

In inland and coastal catchments a large proportion (60% and above) of the pest and land and soil issues stayed the same and a small proportion of these issues decreased. In the Northern Rivers Catchment, 75% of pest issues remained same, 15% decreased and 10% of pest issues increased. In the Southern Rivers Catchment, 66% of pest issues remained same, 22% of pest issues increased and 12% of pest issues decreased. In the Central West Catchment, 61% of pest issues remained same, 16% of pest issues increased and 23% of pest issues decreased. Similarly, in the Western Catchment, 65% of pest issues remained the same 17% of pest issues increased and 19% of pest issues decreased.

In the Northern Rivers Catchment, 78% land and soil issues remained same, 2% of land and soil issues increased and 19% of land and soil issued decreased. In the Southern Rivers Catchment, 73% of land and soil issues remained same, 5% increased and 22% decreased. In the Central West Catchment, 72% of land and soil issues remained same, 6% of land and soil issues increased and 22% decreased. In the Western Catchment, 80% of land and soil issues remained same 3% of land and soil issues increased and 17% decreased.

3. GAPS IN THE AVAILABLITY OF DATA COLLECTION SYSTEMS

The ABS provides leadership in provision of social and economic data for different purposes and to different users. This data is vital for NRM in analysing the social and economic composition of the communities and to understand the impact of various management actions. A number of issues have come up while analysing this data in the context of NRM which are discussed below:

Data availability from varied sources and scales

Agencies other than ABS, for example ABARE, which undertakes Farm Surveys, provide social and economic statistics to inform NRM planning. These data collection systems may meet the objectives for which they are developed but they seem to be dispersed across institutions and are available at different scales and may use different sampling frames. This places a burden on the policy advisers and decision makers to use diverse data sources and data at different scales to provide advice and make decisions in developing and implementing management actions, programs, polices etc.

Availability of data at different geographic scales creates issues in analysis. Data accessibility at state or statistical division levels will be of little use to researchers and policy advisers when they are performing analysis at catchment or sub-catchment levels. This creates problems as one has to rely on approximations or assumptions to undertake analysis at catchment or sub-catchment levels.

For example, physical and mental health statistics are important in understanding the competence of a community in addressing NRM issues. Poor physical and mental health is a barrier to effective NRM, which inhibits people from participating in NRM activities and may be exacerbated by poor seasonal conditions, such as the recent series of low rainfall years encountered across much of eastern Australia. Physical and mental health data are not available at small scale (NLWRA 2005) such as Local Government Area, Statistical Local Area, Collection District or Mesh Block level, making their application to catchment level planning problematic.

Changing data requirements of decision makers

The significance of understanding social and economic processes in the context of NRM have been realised over time, and it has changed the data requirements of the policy advisers and decision makers. This has created a disparity between the information needs and data availability.

The creation of regional administrative bodies based on catchments or NRM regions requires data collection systems at regional level. The data from the Census of Population and Housing is available by regional boundaries and is used to obtain an overview of the social

and economic characteristics of a catchment. However, it does not provide data which is of relevance to NRM, for example, to assess a community's competence in NRM education and training, data available from the Census of Population and Housing is very broad in nature such as, post school qualification in the field agriculture and environmental studies as well as physical sciences, which may be used to understand the capability of a community in NRM education and training. The problem is that it targets only certificate, diploma and degree based education. A lot of NRM education also takes place through training and workshops conducted by industry groups and regional bodies NRM bodies, which is not accounted for in the Census of Population and Housing.

More appropriate and relevant NRM data (which are not available in the Census of Population) will be training and skills imparted on NRM, persons attaining courses on NRM, and education and awareness raising activities on NRM. These indicators are meaningful and relevant in assessing education and understanding of a community in NRM and should be made available along with the post school qualification in agriculture and environmental studies that is currently available from the Census of Population and Housing.

Exclusion of social and economic information from the Agricultural Census and the NRM Survey

Agriculture Census provides an understanding of commodity statistics (ABS 6). Data are available on production and value of a variety of agricultural commodities and inputs used, such as, fertiliser and water usage. Social and economic characteristics are not reported in the Agricultural Census, which is valuable in the context of NRM and also for understanding the social and economic factors that affect agricultural productivity.

An example of relevant social and economic data in the context of NRM is the information on age and education of farm operators, type of employment on farms such as, full-time and seasonal employment, income of farm operators including income earned from farm operations and off-farm income. These statistics would help to understand a community's capability to cope in difficult circumstances, such as drought. Similarly, data on community partnerships in NRM such as, membership of Landcare, Coastcare and Riverrcare groups is very constructive in assessing the level of community participation in NRM activities.

The NRM Survey of the ABS is a sub-sample of the Agriculture Survey, which provides data on managers of agricultural businesses to identify the extent and type of weed, pest, and land and soil problems present on their land, and the activities they undertake to prevent or manage them. It also asks managers of agricultural businesses to provide details of the costs and effort undertaken to address these problems. This information is useful but it is not enough in gaining a complete perspective on NRM in a region. To obtain full comprehension of NRM it is important to know the basic social and economic characteristics of the land managers / farmers which are involved in NRM, in addition to the information provided in the NRM Survey.

Different scope of data collection systems

Social and economic statistics in the Census of Population and Housing Survey is helpful in gaining a broad perspective of a region at varying scales. The social and economic information available from the Census of Population and Housing cannot be matched with the Agricultural Census due to the difference in the scope of data collection of the two censuses.

The Census of Population and Housing includes key characteristics of all people in Australia on Census night, and the dwellings in which they live excluding foreign diplomats and their families and including the visitors to Australia (ABS 5). Its scope is for all individuals in Australia including farmers and NRM managers and people not involved in agriculture and NRM. On the other hand the scope of Agriculture Census is based on agricultural establishments with Estimated Value of Agricultural Operations at $5,000 or more (ABS 6). Due to the difference in the scope of the two surveys, data from Census of Population and Housing Survey cannot be matched completely with the Agricultural Census.

Detailed financial, physical and social information is provided in the ABARE Farm Surveys for the broadacre and dairy sectors that cover over 70 per cent of Australian farm business units. Data in the ABARE Farm Survey is provided at state level, by zones such as pastoral, wheat-sheep and high rainfall zone; industry and by regions in each state. The scope of the ABARE Surveys is agricultural establishments with value of operations at $45,000 or more (ABARE 1). Though it provides detailed social, financial, physical and agricultural data pertaining to agricultural farms, it is limited to wheat-sheep and broadacre farms only and its scope is limited in comparison to the Agricultural Census which covers agricultural establishment worth $5,000 or more.

Lack of information linking socioeconomic and biophysical aspects to show effectiveness of government initiatives

Commonwealth and state governments are involved in undertaking initiatives to improve the capability of the farmers and landholders in managing natural resources which is intended to improve their social and economic status. To understand the effectiveness of government initiatives in terms of improved quality of natural resources, it is important to collect information on a continued basis to connect the degree of adoption of NRM initiatives to improved condition of natural resources and to the social and economic status of the communities.

The NRM Survey of the ABS provides information on the cost and effort undertaken to manage natural resources. Similarly, the Land Management and Salinity Survey 2002, collected information on the extent of land exhibiting signs of salinity and the strategies used by farmers to manage and prevent salinity (ABS 7). The Water Survey Agriculture 2002-03 (ABS 8) looked at water trading, irrigation methods, water reuse on farms.

A common feature noted in the above mentioned surveys, as well as in other natural resource surveys, is that they present information on the adoption of practices by the farming community but do not provide adequate information on the effectiveness of adoption of NRM strategies through improvement in the natural resource quality. Also, there is paucity of data that links and investigates the relationship between the improvement in natural resource quality and improved social and economic well-being. Data collection efforts need to focus on connections between resource condition and economic and social activities from natural resource use to indicate the adequacy of government strategies and programs.

4. CONCLUSION AND RECOMMENDATIONS

Understanding changes to a region over time assists in planning and decision making processes. A social and economic profile facilitates the comprehension of economic and social make-up of a community, which leads to informed NRM decision making. It also assists in anticipating how a community might react to change, such as the impact of building a dam or expanding a mine site etc.

Data from the Australian Bureau of Statistics is being used in compiling Socioeconomic Profiles of the catchments in NSW. The data provided by the ABS are helpful in analysing the overall social and economic composition of the catchments. However, there are some gaps in the availability of this data (as discussed in the previous section) which need to be addressed to make it relevant to NRM.

It is pertinent to highlight the data needs of the policy advisers and decision makers in NRM through a consultation process and to communicate their changing social and economic information needs to the data collection authorities on a regular basis.

The need for improved social and economic data collection systems relevant to NRM practices at regional level should be recognised. It is also important to research the influence of social and economic factors on community's competence in undertaking NRM activities. For example, work by Nelson et al (2005) demonstrated the potential for using data from ABARE Farm Surveys in assessing the vulnerability of farmers and the likely need for structural adjustment in response to impacts on the agriculture sector.

Because most of the privately-owned land in Australia is used for farming, agriculture and NRM go hand in hand. Achievement of effective NRM outcomes requires the development of policy and programs to engage agricultural land managers in NRM actions. Effective engagement, in turn, requires an understanding of the socioeconomic context in which these land managers operate. This paper has demonstrated that data collection systems, such as the Agricultural Census and NRM Survey, support and inform this contextual understanding and should continue to be carried out. However, we have also identified some areas where improvements could be made to enable better comprehension of the challenges faced by rural and other communities in coping with shocks (such as drought) and long-term trends (such as the declining farmer's terms of trade).

ABS and ABARE are in the process of collecting social, economic and agricultural datasets. These datasets are available at different scales and the scope of the data collection is also varied. We believe that it would be in the interests of policy advisers and decision makers in agriculture and NRM that both institutions are encouraged to better coordinate their data collection systems to enhance regional NRM outcomes.

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