

POPULATION STUDIES RESEARCH BRIEF

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Population Studies Group
School for Social and Policy Research
Charles Darwin University
Northern Territory 0909
dean.carson@cdu.edu.au

Assessing the Population Impacts of Big Projects on Darwin

KEY FINDINGS

- 'Big projects' tend to be short term and heavily focused on construction;
- Their population impacts include rapid short term growth, changing age structures, changing sex ratios, changing sources of immigration, changing family and household structures, and population displacement;
- In Darwin, big projects have been associated with periods of rapid population growth; a young but rapidly ageing structure; high sex ratios; high population turnover in the 20 - 35 year age group; increasing reliance on overseas migration to meet labour shortages; and displacement of populations resulting from housing stress and labour market stress;
- It is also possible to link big projects to net interstate migration loss and high rates of family out-migration;
- New big projects are likely to sustain these characteristics. There must be concern about the social capital consequences, and strategies must emerge which help convert short term population shocks to longer term sustainable population growth.

RESEARCH AIM

To describe the ways in which large but short term projects influence population structures in Darwin.

This research brief draws on data from the Census and Labour Force Surveys provided by the Australian Bureau of Statistics, and from the Northern Territory Population Mobility Survey (TMS) conducted by the Population Studies Group in late 2006. The study is part of a program of demographic research funded in part by the Northern Territory Treasury and the Australian Research Council.

The research has been conducted by Associate Professor Dean Carson, Andrew Taylor and Professor Tony Barnes.

Background

On the 26th September 2008, The Chief Minister of the Northern Territory formally announced that Japanese company Inpex would build a natural gas plant in Darwin Harbour. This research brief is concerned with how projects such as this one might impact population dynamics in a place like Darwin. 'Population dynamics' includes influences on age and sex structures and spatial distribution of population as well as population growth.

The Inpex gas plant project is a 'big project' that can be distinguished from other forms of economic development in that it has a relatively short term intensive phase (normally construction), with the ongoing operational phase involving fewer people and lesser investment. In the case of Inpex, for example, the construction phase is likely to create 2 000 jobs over a three or four year period, while operational staffing will be no more than a couple of hundred people.

The Northern Territory has been the site for a series of 'big projects' particularly since the late 1970s. So much so that the Northern Territory Government claims that "Major construction and resource projects have long been a mainstay of growth and development for the Territory's relatively small and open economy" (<http://www.theterritory.com.au/index.php?menuID=148>) and has a specialist Unit devoted to identifying big projects and coordinating their integration into the economy. 'Major projects' in 2008 include the construction of a convention centre and new waterfront district near the Darwin city centre and expanded mining and aluminium processing operations in the Nhulunbuy region. Past major projects include the Cullen Bay development in Darwin, the Jabiluka uranium mine, and another gas plant in Darwin harbour. Big projects are important in the context of the Northern Territory because the population is small and so relatively small changes have large impacts.

The public information about these projects tends to focus on modelling of economic impacts (the Inpex plant has been assessed as potentially contributing \$50 billion to the Northern Territory economy over twenty years) and the creation of jobs. More detailed analysis of the demographic implications of big projects is needed to help plan housing, education, and health services, and to anticipate and manage community responses to change, including impacts on Indigenous development. Detailed analysis might also help manage a transition from an economy based on a series of major project 'shocks' to a more stable path of growth.

This brief is concerned with providing a broad description of the ways in which a big project like the Inpex gas plant is likely to impact a population like that of Darwin. It does not specifically examine the Inpex project, or provide estimates of the scale of impacts consistent with data about that project. What it does is raise some questions about the nature of population change that is normally associated with such projects. It considers how the 'new' populations attracted by such projects might interact with existing populations.

Methods

The observations in this brief include hypotheses drawn from theoretical understandings of population dynamics in places like Darwin and analysis of

population structures in Darwin and the Northern Territory that have largely been documented in other research briefs. Some primary data is drawn from the Population Studies Group *Population Projections* for the Northern Territory (see Research Brief 200815), and the Northern Territory Population Mobility Survey (see http://www.cdu.edu.au/sspr/documents/northern_territory_population_mobility_survey_2006.pdf) which included data about 1 500 non-Indigenous Territory residents. There are also data from the Australian Bureau of Statistics Census of Population and Housing and the monthly Labour Force Survey (quarterly data August 2008).

Results of the analysis are presented as discussion points aligned with key demographic issues – population growth, population ageing, sex ratios, interstate and overseas migration, population displacement, and the duration of change effects.

Results

Attribute	Impacts
Population Growth	<p>The Northern Territory population at June 2008 was an estimated 220 500 people. Nearly 55% of these lived in Darwin. Charles Darwin University population projections models show Darwin experiencing annual population growth up to 2.1% over the next twenty or so years to reach 314 000 by 2036. To a great extent, these estimates assume that the past patterns of economic development in the Northern Territory (driven by big projects) continue, and that they continue to affect population increase (particularly migration) in the same way.</p> <p>While big projects can directly and indirectly create many jobs over time, not all these jobs are created at once. Normally, most of the jobs (perhaps three quarters) are created during the construction phase (two or three years), with a smaller number of ongoing jobs during operation. Even during construction, not all jobs are created at once. Many individuals will end up serving in several jobs throughout construction, and may even transition to operational jobs at the end of the construction phase. In this way, a project that has 3 000 jobs in total may end up employing 2 000 individuals.</p> <p>Outside of the project itself, more jobs can be created in supporting industries, and in the community generally through increased consumption by new residents. Modelling such 'multiplier effects' is notoriously difficult, but it does mean that indirect jobs might still be created some time after the direct job growth has ended.</p> <p>Big project employees might be sourced in a number of ways. They can be 'poached' from other NT based work, require 'fly in/ fly out' (FIFO) models of staffing, convert non-working residents to labour force participants, or</p>

	<p>attract new residents. The former two conditions reduce the number of 'new residents' directly associated with the project, but the first may have a flow on effect if the old employer is able to replace the lost employee with a new resident (rather than adopting poaching or FIFO approaches themselves).</p> <p>Given that Darwin currently experiences almost full employment (greater than 97% of people in the labour force are employed), new jobs need new people and immigration and FIFO are the most likely models. In this context, big projects will create immediate and substantial population growth, even though estimates of such growth need to be tempered by recognition of job transitions (one individual filling multiple positions over time) and tendencies towards FIFO staffing models.</p>
Ageing	<p>The Northern Territory has Australia's youngest age structure, but is rapidly ageing. According to the 2006 Census, the median age in the Northern Territory was 31 years compared with a national median of 37 years. The Darwin median was slightly older than the Territory median at 32 years. The Northern Territory median age increased by nearly six years between 1996 and 2006, making it among the fastest ageing populations in Australia (Tasmania increased by 8 years, but larger states and Territories were around 5 years). More significant than median measures of ageing is the unique age structure of the Northern Territory's, and particularly Darwin's, population (see Research Brief 2008020). Darwin has few people in the very young age categories (under 15 years) and in the older age categories (over 74 years) when compared with Australia as a whole. The population is focused around those aged 30 – 40 years, although most growth over the past ten years has occurred in the 50-60 year age category.</p> <p>According to the ABS Labour Force Survey in 2008, nearly 55% of employees in the construction industry were aged under 35 years. This compared with 45% of employees across all industries. Big projects labour is therefore likely to be relatively young, but will have mixed effects on population ageing. The initial effect would be to reinforce the existing young age structure. However, as there are unlikely to be large numbers of families migrating for big project jobs (see below), and the immigration of young workers may actually contribute to population ageing overall.</p>

Sex Ratios	<p>Darwin has a sex ratio of 108 males for every 100 females (see Research Brief 2008017), with the national sex ratio being 97 males for every 100 females. Interestingly, the sex ratios are lowest (but still over 100) in the 25-40 year age group, which is where most immigration for big projects can be expected to occur. The ABS Labour Force Survey reported that over 90% of construction industry employees were male. It is reasonable to expect, therefore, that most new residents attracted by big projects will be male, and this will sustain the high sex ratios, and even increase them in the key age groups.</p>
Interstate Migration	<p>The Northern Territory has consistently experienced net interstate migration loss over the past 15 years. The net loss recorded for the five years 2001-2006 was several thousand, including 2000 more labour force aged people (15-64 years) leaving the Territory to live in another State than coming to the Territory (see Research Brief 2008011). The highest rates of in-migration to the NT population occur in the 20-34 year age group, with about 37% of the non-Indigenous cohort being new Darwin residents within any five year period. This cohort (and slightly older through to age 39) also has the highest rates of out-migration, with 39% of the average population leaving Darwin in any five year period.</p> <p>Big projects are likely to sustain this high rate of interstate migration, although they may serve to tip the balance in favour of net immigration at least in the short term. This cannot be guaranteed, however, since unemployment is currently low across Australia and there is strong competition for workers in the construction and mining (i.e. trades intensive) industries. Given current conditions (which include regular 'shocks' related largely to construction based projects), it would be expected that many of the new arrivals will stay three or six or twelve months and then move on.</p> <p>Some longer term resident populations will also be attracted, and these are the core of the projected population increase over the next ten or twenty years. They are likely to be older (mid career) and male, but bringing with them their partners and sometimes children. They will be those with management related or highly specialist jobs with secure tenure (at least compared to the trades jobs). They are more likely to come during the operational than construction phase.</p>

	<p>Importantly, older employees with families in Darwin will both stay longer and their times of departure can be predicted with some accuracy based on lifecycle events. For example, history shows that those with young children will bring them, but then the children will leave as they transition from school to university or work, and the parents are likely to follow (particularly if they are approaching retirement age).</p>
Overseas Migration	<p>Should interstate migration be insufficient to meet the short term (construction phase) labour requirements, labour will need to be imported from overseas. The most likely approach would be to use temporary work visa programs (see Research Brief 2008010) as has been the case for the Northern Territory for the past ten or twenty years.</p> <p>Overseas migration has accounted for nearly one-third of all population growth in the Northern Territory since the late 1970s (see Research Brief 2008018). While data are poor (see Research Brief 2008012), it appears that many overseas migrants, including those initially on short stay visas, end up staying longer than is common for interstate migrants. This pattern may be sustained by big projects, although there is some evidence that international construction companies transport their own labour forces between jobs, with limited 'leakage' of temporary workers into the local population. In short, the effects of overseas migration are unclear, and more research is required.</p>
Households	<p>There is evidence of stress in the Darwin housing market as it stands in mid 2008. Rental vacancy rates are extremely low (less than 1% by some estimates) and purchase and rental prices have nearly doubled in the past five years. As a general observation, then, housing migrants associated with new big projects will be a major challenge. Their specific housing needs and preferences increase this challenge.</p> <p>Many new migrants will be young, male, and single. Most will want temporary housing (some of which may be provided by employers), anticipating short stays in the region. Temporary housing is primarily rental accommodation, primarily located near the city centre, and low maintenance (apartments preferred to houses). Young males linked by workplace and in temporary settings tend to establish their own housing markets, with unrelated people sharing rented flats or apartments, and new arrivals sourcing accommodation</p>

	<p>with older residents – so multiple people 'revolve' through a single dwelling over time. They tend not to be price sensitive – they will pay whatever rent is charged so long as the dwelling has the amenity value they seek (which often means being near pubs and clubs and restaurants).</p> <p>Longer term migrants, on the other hand, are likely to seek suburban housing (house and land) and semi-rural 'lifestyle' housing has become more popular in many developed countries. However, longer term residents are more price sensitive, and have a greater range of requirements for their housing than short-term residents. There should be concern about whether Darwin' housing stock has the quality, variety, and setting amenity (semi-rural living, suburban restaurant and recreation precincts etc) likely to appeal to longer term residents.</p> <p>In short, the 'solution' to the housing problem is likely to be multiple solutions, and to involve attention not just to having apartments and houses, but to having them in the right locations and surrounded by the right services and amenities.</p>
<p>Population Displacement</p>	<p>Population growth effects are likely to be at least partially offset by population displacement effects. Many of these effects arise from continuing high levels of population turnover, and particularly amongst young males. Three effects are particularly worth noting –</p> <ol style="list-style-type: none"> 1. The price pressure on housing (particularly rental housing) will displace existing residents, causing them to move away from the city centre. Given a lack of housing stock in other parts of Darwin, this will likely mean moving away from Darwin and the Northern Territory altogether. 2. It is likely that some businesses who have employees 'poached' for the big project will be unable to find alternative sources of labour in the NT or through immigration and will be forced to relocate outside of the Territory ironically as a result of the 'booming economy'. 3. A proportion of the young men who come and work here for short periods will form family relationships with Territory residents. When they leave, they will take new family members with them. <p>Population displacement effects are likely to 'lag' the population growth effects by about the average length of stay of construction workers. The longer that new</p>

	<p>residents stay, the more price sensitive they will become in the housing market, the more likely they will be to bring partners and family with them, and the more available they will become to fill labour vacancies for other businesses. It is important to note that displacement effects are as much about social and cultural capital as they are economic (employment) capital.</p> <p>There may also be important population displacement effects from Darwin based big projects felt elsewhere in the Northern Territory. The Territory's regional populations are even smaller than that of Darwin, and even more susceptible to the effects of small changes. Poaching skilled staff from other NT (but not Darwin) based jobs could result in businesses relocating or closing down due to a lack of skilled staff or lack of capacity to compete for staff in terms of wages and conditions.</p>
Duration of Effects	<p>Big projects tend to have most of their population growth effects over a short period of time, but their impacts on age and sex structure and population displacement can persist even after the labour intensive construction phase. A characteristic of 'big projects' widely observed in the research literature is their essential temporariness from a population point of view. There is a short period (three to five years) of substantial population turmoil with high rates of immigration and growth followed closely by out-migration (particularly in the 'winding down' phase) and population turnover. The population system then stabilises somewhat in the longer term, although it is inevitably changed by the process. Even when longer term impacts are less than what is predicted in standard population estimation models, the fact remains that new people have come and previous residents have left, attitudes to mobility have been influenced and so on. The system can never revert to a previous state, and these systematic impacts (whether they are reflected in population growth or not) are just as important for planners.</p>

Discussion

This brief has identified broadly three types of population change that accompany big projects. The first is the relatively short term and highly volatile introduction of young males during the project construction phase. The second is the mixed effect of increased overseas migration – with probably greater net immigration than interstate migration, but again high 'churn' resulting from a globalised technical labour force.

The third is the more enduring population change resulting from (generally older) managerial and operational staff taking up longer term employment. Not surprisingly, the upshot of new big projects for Darwin is likely to be a continuing of the population dynamics observed over the past twenty years or so – which have emerged from a series of ‘big project’-type shocks.

There are some concerns about these dynamics and their sustainability long term. Global labour market conditions – skilled labour shortages, increasingly mobile labour – may serve to make Darwin less competitive as a destination for short and long term migration. Highly unstable populations tend to increase displacement effects over time as they generate a ‘culture’ of coming and going. Temporary populations are less likely to invest in Darwin’s social capital – sporting and social clubs, political participation, community building and so on. Places with temporary populations and strong focus on export resources tend not to invest in social amenity (health, education, recreation and so on). Longer term residents are generally better positioned to contribute to the process of building social, political and cultural capital. In Darwin’s case, there is an increasingly urgent need to look for ways to address issues of the ageing of the long term resident population, high sex ratios, and limited housing infrastructure.

Making the decision to be a long term migrant is more difficult and complex (and time consuming) than short-term decisions. The role of work in decision making decreases when a) work is readily available in many locations and b) plans are to set up residence for a relatively long period. Promotion of big projects is almost entirely about employment opportunities, but consideration needs to be given to whether the social and community infrastructure is in place to help convert short term population shocks to longer term sustainable population and community growth. Population shocks may be mitigated through synchronising series of big projects so that the workforce can transition from one to the next within the Northern Territory. A complementary strategy may be to position the Northern Territory as a (temporary) exported of skilled workers for big projects in other places. Workers are attracted back to the Territory because of investment in education and professional development infrastructure for workers, and housing, health, education and recreation infrastructure for their families.