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INDEPENDENT STRATEGIC ANALYSIS OF AUSTRALIA'S GLOBAL INTERESTS

Strategic Analysis Paper

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The Future Prospects for Global Arable Land

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Key points

- Population growth and changing consumption habits will create a considerable degree of additional demand which will in turn place pressure on arable land resources.
- Arable land scarcity is the result of a range of human and climatic factors including degradation, climate change, soil constraints, urban encroachment and unequal land distribution.
- There currently remains some 2.7 billion hectares of land with potential for crop production in the world, concentrated in South and Central American and Sub-Saharan Africa.
- The solutions to addressing the availability of arable land are three-fold: the production of more arable land, increase in the productive capacity of existing arable land and the conservation of arable land in order to prevent degradation.
- Despite more than an adequate supply of arable land to meet future demand, land availability will continue to be a major factor in meeting future food security because of the need to find a balance between competing interests and uses and finite resources.

Analysis

Land is absolutely essential to agriculture and therefore the relationship between levels of arable land and food security merits serious consideration. It is projected that by 2050 the world will have a total of nine billion mouths to feed, which represents an increase of around 40 per cent on current levels. This will demand an additional billion tonnes of cereal and 200 million tonnes of meat to be produced annually by 2050. The question remains, however, does the world have enough arable land to provide food for a population of this size?

Arable land refers to land where crops can be cultivated. This usually refers to the totality of land that is not only already cultivated, but also land that has the potential to be cultivated, such as land where the soil and climate are suitable for agriculture, where there is not existing large-scale human settlement, or where the land is not protected by any land right regimen. Whilst land can be made arable by various artifices, arable land in our context refers primarily to land which can be used for production with little or no modification. This is because modifications designed to recapture arable land are often expensive, energy-intensive or politically untenable, and the discussion of arable land in the context of a future facing greater limitations on non-renewable resources.

Reasons for arable land scarcity

According to the Global Land Assessment of Degradation published by the United Nations' Food and Agricultural Organization (FAO), nearly two billion hectares worldwide has been degraded since the 1950s. These two billion hectares represent 22 per cent of the world's cropland, pastures, forests and woodlands. In particular, Africa and Latin America have the highest proportion of degraded agricultural land. Asia has the largest proportion of degraded forest land, as revenue-poor national governments pursue lucrative policies of deforestation.

Degradation is not the only reason for declining levels of arable land. There are a variety of climatic, environmental and human factors all of which have an effect on available arable land resources.

The FAO 2010 World Soil Resources Report isolated erosion hazard, aluminium toxicity, soil shallowness and hydromorphy as constraining between 13 – 16 per cent of global arable land area. These soil constraints make a significant portion of land unsuited for the production of crops without serious modification or enhancement.

Irrigation, deforestation, desertification, terracing, land fill, urban encroachment and issues surrounding topology and land mass further constrain availability of arable land.

Increased investment and diversion of land for bio-fuels production has further contributed to declining availability of arable land.

The increasing scarcity of arable land is also complicated by unequal land distribution. Land distribution refers to the concentration of arable land ownership held by a small wealthy portion of the population. Latin American countries, for example, tend to have higher inequalities in agricultural land distribution than other regions. Inequalities in land distribution often mean that food produced is less likely to be more even distributed, and is often exported for profit rather than sold locally.

Together these factors contribute to a picture of increased degradation of existing arable land, as well as difficulties with making new arable land available in the future.

Regions Facing Shortages

At present some 12 per cent (over 1.5 billion hectares) of the world's land surface is used in crop production. This area represents over a third (36 per cent) of the land estimated to be suitable for crop production to some degree. There remains some 2.7 billion hectares of land with potential for crop production.

This land, however, while plentiful, is unevenly distributed between regions and countries. An estimated 1.8 billion hectares of the potential crop land is located in developing countries, where rapid projected population growth means that demand pressures in the future will be significant. Yet 90 per cent of that 1.8 billion is in Latin America and Sub-Saharan Africa and half of the total is concentrated in just seven countries (Brazil, Democratic Republic of Congo, Angola, Sudan, Argentina, Colombia and Bolivia.) There is virtually no spare land available for expansion in South Asia, the Near East and North Africa. Figure 1 shows the comparative levels of available and potential arable land by region. It supports the assertion that South and Central American countries, and Sub-Saharan Africa show the greatest regional promise for an expansion of arable land.

The population of these areas will continue to grow, with substantial projected population increases for Zimbabwe, Zambia, Belize, East Timor and the Philippines. Asia currently has the least potential for expansion of arable land of all the regions, and is one of the regions hit most hard by degradation. This degradation and future demand increases will combine are likely to exacerbate land shortages in these countries, which are already vulnerable to food insecurity and political instability.

Australia's future prospects for arable land

Compared to the rest of the Asia Pacific region, Australia is in a fortunate position with regards to the availability of arable land. Australia is currently ranked first in the world according to the FAO for actual arable land per capita, at 2.67 ha/per capita. In comparison China has only 0.08 ha per capita.

Australia has one of the lowest levels of severe land degradation resulting from agriculture, currently standing at 3 per cent of total arable land. However, 60 per cent of the landmass is affected by some form of human-induced degradation caused mainly by wind and water erosion. By contrast only 1 per cent of Indonesian land is free from degradation which has been caused largely as a result of deforestation and bad agriculture practices.

Australia does face some serious challenges which will impact on the availability of arable land, which, for all its apparent potential, is still a finite resource. Urban encroachment, salinity and the challenges of water scarcity and management will continue to undermine Australia's future arable land resources unless they are prioritised by public policymakers.

Figure 1 Arable Land Availability by Region (Including Australia)

Region	Total area ('000 km^2)	Potential arable land ('000 ha)	Equiv. potential arable land ('000 ha)	Equiv. potential arable land as % of total land (%)	Actual arable land 1994 ('000 ha)	% of arable land actually in use (%)
Australia	*7 695*	*124 913*	*83 504*	*11*	*47 196*	*37.8*
Asia and the Pacific	28 682	777 935	561 890	20	477 706	61.4
Europe	6 806	384 220	286 887	42	213 791	55.6
North Africa and Near East	11 545	49 632	49 632	3	71 580	144.2[1]
North America	19 295	479 632	345 169	18	233 276	48.6
North Asia, east of Urals	20 759	297 746	226 774	11	175 540	59.0
South and Central America	20 541	1 028 473	743 243	36	143 352	13.9
Sub-Saharan Africa	24 238	1 109 851	752 344	31	157 608	14.2

Source: FAO TERRASTAT Database (Sourced May 2011)

[1] The proportion of potentially arable land presently used may exceed 100% in (semi) arid countries where irrigation practices are common

Possible Solutions

The solutions to addressing the availability of arable land are three-fold: the production of more arable land; an increase in the productive capacity of existing cultivated land and the conservation of arable land in order to prevent degradation.

The alternative to creating more arable land is to improve the yield and productivity of land currently being cultivated. Following the Green Revolution in the late 1960s, yields tripled due to the application of new methods and technologies. These technologies include high-yielding cultivators, chemical fertilisers and pesticides, irrigation and mechanisation. These too, however, are finite resources. The fertilisers and pesticides whose usage has become almost universal in agriculture are predominantly phosphate-based, with phosphorous becoming increasingly expensive to extract.

In the past, non-arable land has been made viable by the digging of new irrigation canals and wells; through the construction of aqueducts and desalination plants and through the use of hydroponics, reverse osmosis water processes, insulation and greenhouses. Yet these processes are extremely expensive and energy intensive, making them untenable in the context of reduced oil reserves and the current lack of a viable sustainable alternative energy source. Furthermore, the use of these methods alone will not result in the creation of enough arable land to sustain increased demand.

Conservation of existing arable land requires policies which monitor the usage and conversion of agricultural land to ensure its efficiency and to hedge against its conversion to industrial or residential property. Conservation also includes measures to reduce the over-reliance on chemical pesticides and fertilisers which harm the carrying capacity of the land, as well as other measures which minimise the desertification, erosion and salinisation that is occurring in some areas due to over exploitation - or misuse.

The best way to increase production, without putting undue demand on existing arable land, or energy-intensively capturing arable land is to address the human factors which are placing strains on arable land resources. In 1981, Harvard Nobel Laureate Amartya Sen, said that all food security problems were political and found that food security in developing nations could be addressed by reforms to wages, distribution, storage and democracy. This advice holds true today. Dwindling arable acreage can be addressed through reform packages which focus on the governance issues which affect arable land availability such as protection, foreign ownership and efficient usage.

It is also suggested that the practice of aiding small-scale subsistence farmers in developing countries is a waste of arable land, which can be better cultivated when aggregated and managed by a large corporate agribusinesses, such as is occurring in Brazil. However this runs contrary to the predominant aid perspective which emphasizes individual capacity-building rather than large scale enterprise.

Conclusion

Discovering that the supply of arable land worldwide is not just adequate, but that it could be used to meet growing demand in the future does not mean that the availability of arable land will not be a major factor in meeting future food security. The barriers to expanding arable land resources are many and varied, with the real challenge for arable land resources being to find a balance between competing interests and uses and finite resources.

The regions facing a shortage of arable land in the future include some of the most developed and populous nations in the world. The hope is that these nations will have the resources as well as the incentive to explore new ways of increasing productive capacity. Similarly, nations with the greatest potential for arable land cultivation are predominantly located in the developing world. It is the responsibility of global governance bodies to ensure that these resources are not exploited, but rather developed to the benefit of both the individual country and the world.

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