GEOGRAPHY BULLETIN

Global Education



Volume 42 No 3 2010

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The Geography Bulletin is a quarterly journal of the Geography Teachers Association of New South Wales. The 'Bulletin' embraces those natural and human phenomena which fashion the character of the Earth's surface. In addition to this it sees Geography as incorporating 'issues' which confront the discipline and its students. The Geography Bulletin is designed to serve teachers and students of Geography. The journal has a particular emphasis on the area of the Pacific basin and its near neighbours and a specific role in providing material to help meet the requirements of the Geography syllabuses. As an evolving journal the Geography Bulletin attempts to satisfy the requirements of a broad readership and in so doing improve its service to teachers. Those individuals wishing to contribute to the publication are directed to the 'Advice to Contributors' on page 73. Articles are submitted to two referees. Any decisions as to the applicability to secondary and/or tertiary education are made by the referees. Authors, it is suggested, should direct articles according to editorial policy.

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GEOGRAPHY BULLETIN

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Special Global Education Edition

This special issue of the Geography Bulletin features a number of articles relevant to the promotion of global awareness in the Geography classroom. A special vote of thanks goes to Dr Susan Bliss, State Manager of Global Education, for her contributions to this issue.

Lobbying begins to secure Geography's place in the Australian Curriculum as a mandatory area of study, Years K–10

As most of you will be aware, Australia is currently in the process of developing its first national curricula. Those for English, Maths, Science and History have been drafted. Those for Geography, Languages and the Arts, are in preparation.

It is our understanding that the Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEECDYA), will consider, at its meeting on 15 October, a proposal in which Geography will be compulsory to Year 8 and an elective in Years 9–10, whereas History will be compulsory to Year 10.

There also appears to an imbalance in the allocation of indicative hours: 60-80 hours for Geography in Years 7-8 and 320 hours for History in Years 7-10.

The basis for overturning the previously balanced treatment of History and Geography in school curricula has not been explained.

It is our belief that all young Australians need a broad general education to become responsible global and local citizens. They will not get it without studying Geography, particularly in Years 9-10 when students have started to develop the maturity to tackle more complex issues.

As these decisions are be taken at a political level, the key Geography stakeholder groups are lobbying Australia's Ministers for Education and bringing the issue to the attention of the media. We're asking you to help us inform politicians. Now is your opportunity to put pen to paper – write to the Minister, draft a Letter to the Editor of your local newspaper or email/write to your local state and federal MPs and Senators outlining why you think it's important that Geography is compulsory up to Year 10.

For your information we have included the stakeholder letter to the Ministers for Education, the GTA's media release, Tim Costello's persuasive case for mandatory Geography, and the GTA's response to the Draft Shape of the Australian Geography Curriculum paper.

(Dr) Grant Kleeman President GTA NSW Editor



Grant Kleeman, Editor

Letter to Ministers' of Education

LETTERHEAD

NOTE: AN INTERNAL DOCUMENT UNTIL ENDORSEMENT RECEIVED FROM ORGANISATIONS LISTED

date

The Hon Simon Crean MP Minister for Education PO Box 6022 House of Representatives Parliament House Canberra ACT 2600

& one to each state education minister

Dear Minister

The National Curriculum

I am writing to you in your role as a member of the Ministerial Council for Education, Early Childhood Development and Youth Affairs (MCEECDYA), on behalf of all the geographical organisations in Australia. We understand that MCEECDYA recently considered recommendations from the Australian Curriculum, Assessment and Reporting Authority (ACARA) on the shape of the Australian curriculum. These recommendations included indicative hours of teaching time to be allocated to each subject, as a guide for curriculum writers, and the years in which each subject will be compulsory or optional.

In the attachment to this letter we argue that these recommendations will result in a deficient curriculum for Australian schools that:

- is narrow with an undue emphasis on three subjects
- has less compulsory study of the social sciences than the present curriculums of the Australian states and territories
- emphasises the study of the past and neglects the study of the present and the future
- neglects the study of some key aspects of Australia's population, economy and social wellbeing that are essential for informed citizenship
- greatly reduces the study of the countries of the Asia-Pacific region
- largely confines the study of Indigenous Australians to the past
- limits the study of sustainability largely to science, and ignores its geographical, economic, demographic, social and political dimensions, and
- gives students a limited knowledge of the world and Australia's connections with other countries.

These are the consequences of the decision to make geography an optional rather than compulsory subject in Years 9 and 10, and to limit the indicative teaching hours for geography to 40 hours a year in Years 7 and 8, and the same in Years 9 and 10 – if studied at all. We find it hard to believe that these outcomes were the intentions of the Ministerial Council, as they conflict with several of the objectives of the Melbourne Declaration on Educational Goals for Young Australians. We ask that you carefully consider this submission from a group of Australian educators and organisations, and request the opportunity to meet with you.

I have also attached a copy of the draft *Shape of the Australian Curriculum: Geography*, so that you can read more about what geography contributes to the education of young Australians. This paper is currently open for public consultation on the ACARA website.

I have written this on behalf of the following organisations: National Committee for Geography of the Australian Academy of Science Institute of Australian Geographers Australian Geography Teachers' Association Geography Teachers' Association of New South Wales Geography Teachers' Association of Queensland Geography Teachers' Association of South Australia Geography Teachers' Association of Victoria Geography Teachers' Association of Victoria Geographical Association of Western Australia Royal Geographical Society of Queensland Geographical Society of New South Wales Royal Geographical Society of South Australia Heads of Geography Programs in Australian Universities

Yours sincerely

Professor Nigel Tapper Chair National Committee for Geography Australian Academy of Science

cc Barry McGaw Peter Hill

Proposed National Curriculum

Our analysis of the proposed structure of the national curriculum leads us to the following conclusions.

1. The curriculum is narrow with an undue emphasis on three subjects

Based on the information available to us, in Years 5 to 10 the total indicative hours of compulsory study are 1120 for English, 1040 for mathematics, 760 for science, 400 for history, 160 for geography, 80 for economics/ business, 80 for civics/citizenship, plus allocations for the arts, health and PE, languages and technologies. Approximately half the total available teaching time is devoted to just three subjects – English, maths and science. Geography, the main subject through which students learn about the contemporary world, gets only 15% of the teaching time of maths.

The Melbourne Declaration on Educational Goals for Young Australians states that the 'humanities and social sciences ... take on greater scope and increasing specialisation as students move through the years of schooling.' However, with the proposed national curriculum, in the secondary years the time allocated to compulsory humanities and social sciences falls from 16% in Years 7 and 8 to just 8% in Years 9 and 10, when only history is compulsory.

We agree that literacy and numeracy are the foundations of education, and that English and mathematics are chiefly responsible for developing these skills, especially in primary school. However, literacy and numeracy skills are general capabilities that are to be reinforced and strengthened by teachers in all learning areas. The proposed curriculum structure does not reflect this, and the hours allocated to social science subjects do not give these teachers the time needed to help students apply and develop these skills.

As the study of geography is both qualitative and quantitative, it presents varied and stimulating opportunities to develop student skills in literacy and numeracy in authentic and engaging contexts.

Evidence was presented in the recent Cambridge Primary Review in the UK that broad curriculums raise the standards of both literacy and numeracy rather than reduce them. Prof Barry McGraw, ACARA's Chair, apparently recognises this:

Literacy is developed in English, but also in ... virtually all subjects since all depend to some extent on literacy. Numeracy will be developed in mathematics but also in science and in other studies that use quantitative methods. The best way to develop the literacy and numeracy skills of students is, therefore, to provide them with a full, rich curriculum.

By devoting large amounts of teaching time to English and mathematics, the proposed structure of the national curriculum may produce the opposite result to that intended.

2. The curriculum has less compulsory study of the social sciences than in the present curriculums of the Australian states and territories

The geography community enthusiastically welcomed the joint Premiers' statement, *The Future of Schooling in Australia*, in which Studies of Society and Environment (SOSE) was replaced with the humanities and social sciences disciplines of history, geography and economics. What we did not envisage was that this would result in the humanities subject, history, becoming a compulsory subject in Years 9 and 10, but that no social science subjects would be.

This is a backward step for NSW, where 100 hours of geography are mandated in Years 9 to 10. In other states and territories, students cover a combination of social science areas, together with history, within the compulsory SOSE learning area. Most jurisdictions do not specify hours, but in the ACT for instance, the SOSE learning area is allocated 320 hours in Years 9 to 10.

3. The curriculum emphasises the study of the past and neglects the study of the present and the future

It is essential for the national curriculum to be forward-looking (or future-oriented). While young Australians need to understand the past they also deserve to have an appreciation and understanding of the great challenges that will shape, and are shaping, the world they will one day inherit.

The curriculum will not achieve this by privileging the study of history over geography. To again use NSW as an example, the compulsory study of geography will drop from 200 hours over Years 7 to 10 in the NSW curriculum to just 80 hours in the national curriculum, while the compulsory study of history in Years 7 to 10 will increase from 200 to 320 hours. This is a major shift in the balance between studies of the past and the present.

The proposed structure will not produce a contemporary or future-oriented curriculum.

4. The curriculum neglects the study of some key aspects of Australia's population, economy and social wellbeing that are essential for informed citizenship

Geography is the discipline that enables students to engage with the great challenges confronting humanity. Contemporary geographical studies include the impacts of climate change, population growth and habitat loss; land and water management; sustainability; global inequalities; urban planning issues; natural resource use; and geopolitical change.

Geography equips young people, who are our current and future citizens, with the knowledge, skills and values to make informed decisions on issues such as these. Students should have an entitlement to develop these capabilities as they mature, not to stop at Year 8.

In Year 10 geography, students might investigate spatial patterns of economic and social wellbeing, and their consequences; or study human dependence on environmental resources. Surely these are at least as important as learning how to expand and factorise quadratic expressions, which all students must study in Year 10 mathematics, or modelling chromosome change and movement during mitosis and meiosis, which all students must study in Year 10 science, to give just two examples.

Assigning geography an optional status in Years 9 and 10, will limit students' capacity 'to make sense of their world' and to become 'responsible global and local citizens', both aims of the Melbourne Declaration. Even the capacities of students who choose to study optional geography in Years 9 and 10 will be curtailed, with only 80 hours of teaching time in geography over the two years.

The proposed structure will not help prepare students for informed and responsible citizenship – something which geography does well. In particular, by exploring local, national and even global issues, and examining what actions could be taken to respond to these issues, geography students become active citizens.

5. The curriculum greatly reduces the study of the countries of the Asia-Pacific region

Geography should make a significant contribution to students' understanding of the Asia-Pacific region. However, with the proposed curriculum, from Year 9 studies of Asia will largely be confined to its pre-1900 history. Geography can give students an understanding of Asia as a world region, a holistic view of a selected Asian country, and in-depth studies of social and/or environmental issues at a range of scales in Asian countries. With only 40 hours of teaching a year, teachers will struggle to achieve this in Years 7 and 8, and will not be able to do it at all in Years 9 and 10 for students who choose different electives. No other subject can fill this gap.

There are many contemporary issues in the Asia-Pacific region that Australians need to understand, and to consider their effects on Australia. Within the new Australian curriculum, only geography is well placed to provide this understanding. As examples, these issues include:

- Drivers within Asia for migration to Australia, including refugee migration
- Population trends. It is not widely known in Australia that Indonesia has dramatically reduced its rate of population growth, that Japan is facing a declining population, and that China's population will peak around 2030 and then decline. These trends have considerable significance for Australia, and ignorance of them influences attitudes towards Asia.
- Regional differences within countries and their economic, social and political consequences. An example is the east-west contrast in development in China, which has considerable political significance.

All students should develop a deep understanding of the diversity within and between countries such as China, Japan, India and Indonesia. These are major trading partners and the powerhouses of our region. The educational goal of Asia-literate students will be seriously compromised by making geography optional in Years 9 and 10.

6. The curriculum largely confines the study of Indigenous Australians to the past

Another of the objectives of Goal 2 of the Melbourne Declaration is that young Australians should:

understand and acknowledge the value of Indigenous cultures and possess the knowledge, skills and understanding to contribute to, and benefit from, reconciliation between Indigenous and non-Indigenous Australians.

Under the proposed curriculum structure, students' knowledge of Indigenous peoples and their lives will be limited and unbalanced. From Year 9 it will mainly be confined to what is included in the history and science curriculums. We believe that unless students have knowledge and understanding of the lives of Indigenous people today, they will be unable to contribute to and benefit from the goal of reconciliation. Geography gives students the opportunity to study many contemporary issues that affect Indigenous people, for example, environmental management, population structures, local economies, use of resources, and spatial differences in socio-economic status. These issues are often contentious and students need some maturity to study them.

Geography brings a unique perspective to students' understanding of Indigenous cultures because Indigenous Australian's close connection to place resonates with the core of geography. Aboriginal and Torres Strait Islander ways of knowing, viewing and relating to the world are perspectives that fill well in geography.

7. The curriculum limits the study of sustainability largely to science, and ignores its geographical, economic, demographic, social and political dimensions

The knowledge that students need to 'work for the common good, in particular sustaining and improving natural and social environments', to again quote from the Melbourne Declaration, will be largely confined to what is included in the science curriculum. We fully acknowledge that science has an important role to play in delivering this cross-curriculum perspective, but geography has an equally important role.

Students cannot make informed decisions on sustainable patterns of living, by looking only at the science. They also need to look at the geographical, economic, demographic, social and political dimensions. Geography is also the only subject that will teach students about the social environments mentioned in the Melbourne Declaration—about communities, local economies, population trends, socio-economic conditions and the economic and social sustainability of places.

The proposed outline for the geography curriculum in Year 10 includes a unit specifically on environmental sustainability, whereas there is no focus on sustainability in Year 9 and 10 science.

Again, one of the overarching educational goals of the new curriculum will be seriously compromised by making geography optional in Years 9 and 10.

8. The curriculum gives students a limited knowledge of the world and Australia's connections with other countries

The significance of global integration and the need for a sense of global citizenship are included in the Melbourne Declaration, but the curriculum has reduced the opportunity for them to be studied by all students by making geography optional in Years 9 and 10. Geography is the main subject that teaches about the world, and about Australia's connections with other countries – connections such as the movement of people, flows of trade and investment, cultural influences, and the exchange of ideas and information.

Geography gives students a more accurate knowledge of other countries, breaking down stereotypes. This is a prerequisite for genuine inter-cultural understanding.

7. Conclusion

Our analysis of the proposed Australian curriculum, outlined above, suggests that it has some serious deficiencies. The curriculum will not fulfil several of the goals of the Melbourne Declaration, goals which we strongly support. It will not produce students with a good understanding of Indigenous Australians, of sustainability, and of the countries of the Asia-Pacific region. It will not teach students about some important characteristics and issues of their own country, and it will not give them some of the essential knowledge they will need to be informed citizens.

We respectfully request the Ministerial Council to re-examine the status of geography in Years 7 to 10 of the Australian curriculum.

From:

National Committee for Geography of the Australian Academy of Science Institute of Australian Geographers Australian Geography Teachers Association Geographical Society of New South Wales Geography Teachers' Association of New South Wales Geography Teachers' Association of Queensland Geography Teachers' Association of South Australia Geography Teachers' Association of Victoria Geographical Association of Western Australia Royal Geographical Society of Queensland Geographical Society of New South Wales Royal Geographical Society of South Australia Heads of Geography Programs in Australian Universities

The GTA's Media Release

13 September 2010

MEDIA RELEASE

Where Would We be Without Geography

Geography teachers and academics in NSW and throughout Australia are concerned that students will not receive a balanced education under the new national curriculum.

Dr Grant Kleeman, Vice-President of the Australian Geography Teachers' Association said he understood the Ministers of Education were considering a proposal in which geography would be an optional subject in Years 9–10, whereas history would be compulsory.

"The basis for overturning the previously balanced treatment of history and geography in school curricula has not been explained and should be debated openly," said Dr Kleeman.

The geographical associations in Australia have jointly written to the Ministers of Education.

They argue in the letters that a Year 9–10 curriculum without geography will: neglect the study of key aspects of Australia's population, economy and social wellbeing that are essential for informed citizenship; ignore the geographical, economic, demographic, social and political dimensions of sustainability and largely limit the study of that important area to science; confine the study of indigenous Australians to the past; and, offer students a limited knowledge of the world and Australia's connections with other countries at a time when international connections are increasingly vital.

Dr Grant Kleeman, who is also President of Geography Teachers' Association of NSW, said geography was a vital part of every young person's education, including in Years 9 and 10 when students were developing the maturity to tackle more complex issues.

Take, for example, environmental sustainability, Australia's current population debate, the issue of refugees, the impacts of global warming, and land and water management.

Also relevant here is international events such as the recent floods in Pakistan.

"With geography, students can examine not only the weather patterns and landscape characteristics that led to the flooding, but also the past decisions about river management and irrigation infrastructure, and the effects on communities."

"Geography gives students a holistic framework for understanding their world. That's why it should be a core subject to Year 10," he said.

For further information and interviews contact:

National: Dr Grant Kleeman, 0414 371 313, grant.kleeman@mq.edu.au

Critiquing the draft *Shape of the Australian Geography Curriculum Paper*: The GTA's submission

Consultation on the draft *Shape of the Australian Curriculum: Geography*

The following evaluative comments and observations are the outcome of a forum conducted by the Geography Teachers' Association of New South Wales on Thursday 5 August 2010. The agreed comments and observations are organized according to the structure of the document.

These responses are predicated on Geography being mandated in Years K–10. If a decision is made to do otherwise, the shape paper will require quite fundamental revision. The arguments in favour of mandating Geography in Years K–10 is overwhelming. Please see attached the press release by Mr Tim Costello, CEO of World Vision.

Rationale

The rationale, for the most part, represents a clear and coherent statement of the discipline's relevance in a contemporary curriculum context. The opening paragraph (Paragraph 1) features a concise and well-informed definition of Geography – "the environmental and human characteristics of the places that make up our world".

It is important to note that 'environment' is defined by way of a footnote. The terms 'biophysical' and 'built' environments, as defined, are consistent with the terminology used in NSW Geography syllabuses. Significantly, however, the terms 'environment' and 'environmental' are used only in reference to the biophysical environment in the document. This usage is subsequently qualified when the author of the paper asserts that when geographers study the biophysical environment they also investigate the interrelationships between human societies and the environment. Presumably this includes the 'artifacts' of this interaction (elements of the built environment). The lack of clarity here may be confusing for students (and non-specialist teachers). The term 'human environment' is avoided.

Recommendation: 'Environment' is best used 'generically' or holistically – referring to both the biophysical and built environments. The meaning ascribed to 'environment' in any subsequent syllabus document would need to be qualified by the terms 'biophysical' and 'built'.

Paragraph 2 provides a detailed explanation of 'space'. Given that the term 'neighbourhood' is featured in the 'scope and sequence' section of the document it would be advisable to include reference to it in this particular context.

Paragraph 3 lists the characteristics of places typically studied in Geography. Paragraph 4 notes that geographers are interested in both the similarities and differences Dr Grant Kleeman, President GTA NSW

between places. Paragraph 5 builds on this by stating that geographers often study the spatial distribution of phenomena in the search for regularities in distributions (patterns). Paragraph 6 emphasises the notion of dependency and how the same processes can produce different outcomes in different places through their interaction with local environmental, economic and social conditions. The final paragraph identifies the interaction between human societies and their biophysical environment as a key theme in Geography.

All this is relevant and useful in terms of 'staking out' Geography's claim to be a distinct, integrating discipline, but does it constitute a persuasive case for Geography's inclusion in the mandatory core of the Australian Curriculum?

Why Geography?

The first paragraph of this section mounts a more persuasive case for Geography's inclusion as a mandatory area of study in the Australian Curriculum. It notes the ways in which Geography draws on, and enhances, students' 'curiosity about places', and the sense of 'wonder' that can be engendered through an engagement with the world. It also draws attention to the empowering nature of the 'geographical imagination' and recognizes that geographical knowledge enhances the capacity of students to understand, debate and make informed decisions on a range of current local, state, national and global events and issues.

The rationale then goes on to stress Geography's importance in developing students' understanding of key aspects of Australia's environment, population, economy and society (Why not a broader perspective here?); the life supporting resources and services provided by the biophysical environment; the ways in which the world can be viewed spatially; the significance of location; the ways spaces are organised and designed, and the consequences of this for different groups of people; the spatial distribution of phenomena; the causes and consequences of economic and social differences between places; and the extent to which Geography provides opportunities for students to learn how they can have an influence as active citizens.

It is pleasing to see the implicit reference to 'critical thinking' in Paragraph 13.

Overall, there appears to be an overemphasis on defining Geography as a discipline rather than highlighting its contribution of Geography to the intellectual and social development of young Australians.

The shape paper rightly states that:

"Geography answers our questions about why places are like they are, and how they are connected to other Critiquing the draft Shape of the Australian Geography Curriculum Paper: The GTA's submission

places . . . encouraging students to be thoughtful local and global citizens when making decisions that affect their lives and the lives of others."

But there is a need for the Shaping Paper to be more strident in advancing the relevance of Geography in a rapidly changing world.

Tim Costello notes that "[Geography] is the subject that deals head-on with the globally integrated world we live in and the big issues of sustainability, migration, refugees and asylum seekers, global inequalities, population, and climate change."

Recommendation: The rationale needs to be more futures orientated. It especially needs to emphasise the extent to which Geography can empower students to better confront the challenges they will encounter as they assume responsibility for the stewardship of the planet. The Shape Paper needs to focus, more explicitly, on the importance Geography plays in promoting active, informed citizenship.

Recommendation: Revise the Shaping Paper so that the emphasis in on 'learning' rather than 'teaching'.

Aims

The cited aims are fine but an opportunity has been missed to go beyond "*helping students to make sense of their own experience of the world*" to provide them with the knowledge, understanding and skills required to empathise with the ways other people and peoples engage with the world.

There is also repetition evident in the existing list of aims. Some rationalisation is possible. For example, Aim 6 relating to the promotion of the 'fascination of place' through fieldwork and the use of new technologies could be subsumed within Aims 2 and 10.

Cross-curriculum dimensions and capabilities

The section deals with Geography's contribution to ACARA's list of general capabilities and cross curriculum dimensions. For the most part, the section is well written and is, therefore, supported.

Curriculum organisation

The proposed K–12 Geography curriculum is organised around the two 'strands': *geographical knowledge and understanding* and *geographical inquiry and skills*. This approach is appropriate but the use of 'place', 'environments' and 'space' unnecessarily complicates the organisation of content. A number of forum participants considered the concepts of 'place' and 'space' too vague to be used as content organisers. Some considered it a rather 'dated' means of organising Geography syllabus content.

Geographical knowledge and understanding

The inclusion of the following statement '*However, this does not imply that all viewpoints are equally valid, or that all answers have the same status*.' This clearly contradicts the perspectives-based approach adopted in the NSW Geography curriculum and raises the question of who should be the arbiter of such viewpoints.

The inclusion of a list of 'key concepts' in Geography is a welcome inclusion as are the concepts related to the practice of geographical investigation.

The reference to the 'contested' concepts of 'space' and 'scale' is interesting given that these are to be used as content organisers. Should there be a degree of consensus around such concepts before they are assigned such a fundamental role in a syllabus document?

The reference to 'explanatory frameworks' in Paragraph 39 is fine but what of the reference to 'models'? It is pleasing to see the reference to geographical understanding here rather than just the mastery of content. The application of geographical knowledge to new and emerging contexts and issues is important if Geography is to retain its relevance and utility.

The use of the three 'perspectives' – place, environments and space – to provide the 'vertical structure' of the proposed curriculum is, as outlined below, problematic. The content is to be 'predominantly' studied through the perspective under which it is listed. But, it does not preclude a consideration of the relevance of the other two perspectives. This will prove problematic in terms of defining the scope (and perhaps sequence) of the specified content areas. It will certainly make planning unnecessarily complicated. The suggestions regarding syllabus content highlight the difficulty in developing an appropriate scope and sequence using this approach.

Geographical inquiry and skills

This section is organised around three key elements of geographical inquiry – the questions that arise from students' observation, discovery and exploration of the world; the methods and skills geographers employ; and where to look for answers to 'why' questions. The listing of the various approaches to geographical inquiry is interesting but is it too highly specialised or sophisticated for the study of Geography in the stages of learning (K–10) addressed by this document?

Organisation of learning

It is pleasing to see the emphasis assigned to inquirybased learning. This approach is consistent with the methodology underpinning the NSW Geography syllabuses. It is also appropriate that the subject of geographical investigations should be addressed against the criteria of environmental sustainability, economic costs and benefits, and social equity.

Critiquing the draft Shape of the Australian Geography Curriculum Paper: The GTA's submission

The need to identify the concepts, skills and ways of explanation is made explicit, as is the need to horizontally integrate geographical inquiry and skills. This is a welcome inclusion.

The attention given to the 'scale of study' is important. Comparisons within one level of scale, and analyses across different levels of scale, are portrayed as being an important aspect of geographical inquiry. The Shape Paper also notes that no one year of the curriculum should focus exclusively on Australia, or exclusively on places outside Australia. This approach is strongly supported by NSW Geography teachers.

Significantly, the Shape Paper states that the proposed syllabus should avoid prescribing specific case studies that all students must do. This flexibility enables teachers to select case studies considered to be the most relevant to the needs and interests of their students.

Also welcomed is the explicit recognition of the need to focus on *"topical and current events and issues"* and the emphasis given to the countries of the Asia-Pacific region, and those considered important to Australia's political and security relationships, cultural heritage and influence, migration, economic relationships, tourism and global environmental issues.

Curriculum flexibility

As noted above, there is strong support for curriculum flexibility and the 'geographical neutrality' of the curriculum. This will enable teachers some freedom to adapt units to suit their own location and expertise.

Scope and sequence Years K-10

As suggested above, the 'perspectives' of place, environment and space don't work as 'content organisers'. The suggested content areas (or topics) do not fit neatly within any one perspective domain. Typically, and quite naturally, they feature elements of all three 'perspectives'. Perhaps it would be much more effective, and clearer, to use the 'perspectives' of place, environment and space as general 'conceptual themes' rather than organisers. The content areas would be best organised linearly.

Related to this observation is the perceived lack of conceptual coherence evident in some of the content areas specified in the Shape Paper. There is some interesting material but there is no coherent (or engaging) conceptual narrative. The current NSW Years 7–10 Geography Syllabus, for example, uses 'communities and environments' as its organisational and conceptual framework. This works well, giving the syllabus a content scaffold that is both relevant and coherent. This is not to say that the Australian Geography Curriculum needs to draw on same central concepts, it does, however, need something less abstract that the current proposal.

Place perspective. There is, as appropriate, an emphasis on the 'places' most immediate to the students' own

lived experience in Years K–6. It is, therefore, surprising that in Year 7 students should again be required to focus on the local (in this instance the neighbourhood). This seems to be at odds with our understanding of students' interests at this stage of learning and the stated aim of *"nurturing students fascination with places"*. One might also question the wisdom of limiting the neighbourhood (and comparative study) to the population and community structure. Presumably, students would need to study the demographic profile of the nation as a whole in order to make judgments about the relative 'positioning' of their own neighbourhood.

The balance of the 'place' perspective for Years 7–10 is devoted to *"a comparative study of places and countries"*. Little is provided in terms of what students will look at when they do their *"deeper study of selected countries"*. This content, if it is to be retained, will need considerable elaboration and a more credible rationale and focus.

Environment perspective. This is a better developed and more conceptually sound content sequence. There is, however, a need for students to develop a more sophisticated understanding of the biophysical process on which such knowledge and understandings is based as they proceed through the secondary school.

There is too much content for the indicative time suggested for Years 5–6.

Recommendation: Include reference to 'action' – the application of active and informed citizenship.

Space perspective. It is in this particular 'perspective' where the lack of an integrating conceptual framework is most obvious. What is the rationale for the selection of topics? What is the rationale for studying sport, tourism, surfing, popular culture, food, retailing, crime, and cyberspace. There needs to be a geographical focus. A more explicit conceptual framework is essential. Perhaps 'globalisation' could be used as the 'entry point of study'. Again the emphasis is on the local.

Overall, there is too much emphasis on the local. There also appears to be an overemphasis on economic geography.

Recommendation: Abandon the 'silo' approach to the organisation of syllabus content. Treat 'place', 'environment, and 'space' as conceptual themes and organise content as an integrated whole.

The senior secondary years

Four 'topics' are identified here. These are:

- An in-depth study of one or more environments such as coasts, deserts, rivers, forests and urban environments the focus is on environments at risk and risky environments.
- Independent or negotiated geographical investigation.
- Changing spatial structure of the global economy,

Critiquing the draft Shape of the Australian Geography Curriculum Paper: The GTA's submission

population movements, global resource consumption and the environmental consequences, global inequalities, cultural diversity and localism.

• Studies of the sustainability and future of urban and rural places.

The suggested approach received general support but additional detail is required. As it stands there is:

- too much overlap between Year 10 and Years 11 and 12;
- a lack of coherent rationale for the selection of suggested content; and
- little indication of a conceptual narrative underpinning the suggested content areas.

It was suggested that Political Geography or Geopolitics be included in Topic 3 as a means of contextualising and explaining the occurrence of the issues addressed. Recommendation: Eliminate the overlap between Years 10 and 11 & 12. For example, both include a focus on environmental sustainability, urban environments, forests and natural resources.

Recommendation: Develop a conceptual framework/ narrative that informs the selection of content.

Pedagogy

The statement on pedagogy is so limited in its scope one is left wondering why it was include. An opportunity to better frame the nature of learning and teaching in Geography has been missed. It simply states the emphasis Geography assigns to inquiry-based learning.

Recommendation: More effectively ground Geography the constructivist pedagogical domain.

Dr Grant Kleeman President, NSW GTA



With the introduction of the Australian Geography curriculum in 2012 this conference is expected to draw widespread interest and participation from all States and Territories.

The conference will provide:

- an unprecedented opportunity to become familiar with the nature of the K-12 Australian Curriculum for geography and find out what resources and support are available for implementation over coming years
- workshops and keynotes have been designed to cater for primary and secondary school implementation of the Australian Curriculum for geography
- free K-12 resources to support implementation of geography in your school will be provided to all conference participants.

Further details at: www.agta.asn.au/conf2011/index.htm

Tim Costello argues the case for mandatory Geography

What in the world are we teaching our kids?

What in the world are we teaching our young people? What do we want young Australians to know about the world and their place in it? What fire do we want to light in their lives? What are the questions that Australians need to be asking? The current election highlights the need for a critical, globally aware generation with a passion to care for the most disadvantaged and vulnerable – a generation who will ask the hard questions about climate change, asylum seekers, foreign aid, and Indigenous Australia.

Australia needs to be educating a generation who will be informed and active citizens engaged with our democratic processes. We need a generation who will have a passion to see our governments implement policies for sustainable development and a real concern for the needs of the poor.

One of the Labor Government's most significant initiatives is the Australian school curriculum. The draft Australian Curriculum for Geography is currently seeking feedback from interested parties. It states, "Geography answers our questions about why places are like they are, and how they are connected to other places . . . encouraging students to be thoughtful local and global citizens when making decisions that affect their lives and the lives of others." It is a subject that deals head-on with the globally integrated world we live in and the big issues of sustainability, migration, refugees and asylum seekers, global inequalities, population, and climate change – some of the hot topics of the current election.

A thoughtful student of geography would appreciate that people seeking asylum in Australia are fleeing some of the worst humanitarian situations you can imagine. A generation of informed, educated Australians would know that Australia takes about 13,500 refugees as part of its overall immigration intake and that Australia is not 'being flooded' with asylum seekers. A globally aware student would engage with the political debate and point out that it is countries like Pakistan, Chad, Kenya, Iran and Syria that are being flooded – countries with far less capacity than Australia. They would know too that it is not 'illegal' to arrive in Australia by boat and seek asylum.

Similarly, students of geography would know that the world's poorest people are already suffering due to climate change and will continue to suffer the most with more prolonged droughts, more severe floods and storms, less food and more disease. They would appreciate that without more ambitious action, the tide of displaced people seeking a place of refuge is expected to swell. They would be aware of UNICEF reports that climate change could contribute between 40,000 and 160,000 extra child deaths a year in Asia and the Horn of Africa. Calls for significant action on climate change may now be politically incorrect but that would not deter the active citizenship of a well educated Australian population. Geography is a



Rev Tim Costello, Kippax Uniting Church, Canberra, ACT. Photo courtesy of Peter Ellis. Source: Wikimedia Commons

subject that needs to be a core subject for the compulsory years of schooling and not an optional extra. As in the current NSW curriculum, it deserves the same profile and place in the timetable as does History. There is a genuine concern that this may not be the case in the new Australian curriculum. We need young Australians who can learn from the past and be critically aware of the issues facing the world in the present and the future. The subject matter is too important for it to be merely an elective in an already crowded curriculum. It is also a vehicle through which critical literacy and numeracy skills can be taught in an engaging, real life context. Geography is not just about reading maps and the learning of capital cities.

Geography involves hard, critical thinking and the development of important knowledge and skills. Yet the draft curriculum wisely recognises that "it should also include a consideration of how the knowledge gained can be applied and of what actions might be taken. Geography's outward disposition also encourages an engaged, involved outlook; a desire not merely to observe the world but to change it for the better."

Our children need a great education that equips them for an increasingly globalised world – and our world needs a well educated and globally aware Australia.

Tim Costello



GLOBAL EDUCATION 2010-2011

Dr Susan Bliss, Director Global Education NSW

From 2010 the New South Wales Global Education Project, funded by AusAID, will be managed by the Professional Teachers' Council of NSW (PTC NSW). Dr Susan Bliss will continue to be the Director, assisted by two managers Deb Simpson (secondary) and Nina Culleton (primary).

The PTC NSW is the peak body for 47 professional teachers' associations and Kim Tsolakis is the Executive Officer. The PTC NSW supports the project with administrative and accounting services, sale of resources and a website with global education teaching material.

The global education program has two components:

- pre-service teacher training (universities);
- teacher professional development (professional teachers' associations).



As global education is studied as a transdisciplinary subject in NSW, *Global Perspectives: A statement* on global education for Australian Students (2008) is integrated across all subjects K–12 with a focus on: Geography and Primary HSIE. Other subjects include: International Studies; Legal Studies; Economics; Business Studies; Commerce; Society and Culture; Studies of Religion;

English; Science; History; Arts/Music; Technology; Languages; Mathematics; Earth and Environmental Science; Agriculture; and PDHPE.

Universities incorporating a global perspective across curriculums include: University of Sydney, Koori Centre University of Sydney, Macquarie University, University of Western Sydney, University of Technology, University of Wollongong, University of Newcastle, Australian Catholic University, Notre Dame and Charles Sturt University.



Arthur Burch, Manager Global Education Australia/AusAID at left, with Kim Tsolakis Executive Officer PTC NSW.

The NSW Department of Education and Training, Catholic Education Commission and the Association of Independent Schools support global education by conducting conferences and workshops on global topics in urban, regional and rural areas

The goal of the New South Wales Global Education Project is to:

- raise awareness and understanding of development, poverty, and global contentious issues amongst primary and secondary teachers and pre-service university students across NSW;
- prepare students to live in an increasingly globalised world;
- enable students to acquire a global perspective and recognise that others may have different views;
- recognise commitment to the common good, both intergenerationally and intra-generationally, if societies and environments are to be sustainable;
- promote knowledge and understandings; values and attitudes; skills and processes relevant to living responsibly in a multicultural and an interdependent world; and
- enable students to become informed, responsible active citizens able to shape a better future world that is equitable, just, peaceful and sustainable.

Contact the Professional Teachers' Council NSW for Global Education professional development information and resources.



PO Box 577, Leichhardt NSW 2040 Phone (02) 9564 3322, Fax (02) 9564 2342, Email: admin@ptc.nsw.edu.au Website: www.ptc.nsw.edu.au

GLOBAL SATON

'BUTTERFLY' OR 'RIPPLE' EFFECT' OF ICELAND'S VOLCANIC ERUPTION



The truth of poet John Donne's words that no man is an island and that everyone is a part of the whole, became a reality on 14 April 2010

Introduction: links between places

The eruption of the Icelandic volcano Eyjafjallajökull on 14 April 2010 led to a chain of events that spread around the world. By 16 April volcano ash, thrown several kilometres into the air, caused thousands of cancelled flights and millions of passengers were stranded or delayed across airports from Europe to North America, Africa, Asia and Australia. The nearly week long halt in flights created the highest level of air travel disruption since the Second World War and cost airlines hundreds of millions of dollars. It also raised questions about our ability to respond to a natural crisis.

From past experiences volcanic ash, made of pulverised rock and glass, is capable of jamming aircraft engines and contaminating air inside the cabin. This fear brought European aviation to a near standstill and exposed the vulnerability of a highly integrated global economy. For example farmers in Kenya faced ruin as they were forced to dump tonnes of vegetables and flowers to be exported to the United Kingdom. Kenya's flower council said the country was haemorrhaging \$1.3 million a day in lost shipments to Europe.

A century ago an Icelandic eruption would not have affected menus in Florence or an auto assembly plant in Tennessee. But over the past few decades, the lifestyle of millions of people has become increasingly dependent on economic activities and production processes thousands of kilometres away from where they live. Today globalisation means companies source components and products from Dr Susan Bliss, Director Global Education NSW

all over the world. The problem arises when there is a small disruption anywhere in the world and the machinery of global capitalism is forced to slow down.

Iceland: characteristics of place

The island of Iceland lies on the Mid-Atlantic Ridge, the boundary between the Eurasian and North American tectonic plates. As these two plates move apart, magma wells up along the ridge, creating a new sea floor. This means Iceland is engaged in a geologic race between the spreading motion which is ripping the island apart, and the volcanoes which are building the island up.

Eyjafjallajökull (pronounced ay-yah-FYAH-lah-yer-kuhl) is Icelandic for 'island-mountain glacier'. It is a stratovolcano fed by a magma chamber under the mountain. It is part of a chain of volcanoes stretching across Iceland. Its nearest active neighbours are Katla, to the northeast, and Eldfell, on Heimaey, to the southwest. The volcano is thought to be related to Katla geologically, as eruptions of Eyjafjallajökull are generally followed by eruptions of Katla.

The volcano has been periodically active for the last 800 000 years. Previous known eruptions at Eyjafjallajökull occurred in the 10th and 17th centuries. The last time the Eyjafjallajökull volcano erupted, the eruption lasted more than a year, from December 1821 until January 1823. The ash from these eruptions, found over the south of Iceland, is dark grey in colour, small-grained and contains 28%– 40% silicon dioxide.

Photograph above by Brynjar Gauti/AP: Volcanic eruption of Eyjafjallajökull surrounded by farms in southern Iceland. Source: www.flickr.com/photos/khoavo/4536873373/

Changes to place: events during 2010

- December 2009, seismic activity was detected in the volcano area. Thousands of small earthquakes, mostly magnitude 1–2 on the Richter scale, occurred 7–10 kilometres beneath the volcano.
- 26 February 2010, seismic activity with rapid expansion of the Earth's crust caused the huge crustal displacement at Porvaldseyri farm.
- 3–5 March seismic activity continued to increase. About 3,000 earthquakes were measured at the epicentre of the volcano.
- 20 March the eruption began 8 kilometres east of the top crater of the volcano in a popular hiking region called Fimmvörðuháls. This first eruption was in the form of a fissure vent. It did not occur under the glacier and was small in scale. It caused the brief evacuation of 500 people.

Iceland topographic map

Map: Geology of Iceland



Source: http://en.wikipedia.org/wiki/ File:Volcanic_system_of_Iceland-Map-en.svg



Date	Time	Area [km ²]
21 March	7:00 AM	0.05
21 March	9:30 PM	0.14
22 March	3:00 PM	0.34
24 March	3:00 PM	0.37
26 March	10:00 AM	0.68
31 March	12:00 PM	0.95

Note: Pictures taken 27–28 March 2010 indicate that the lava margin had reached approximately the current location 28 March.

Source: http://feww.wordpress.com/tag/volcanism/

- 14 April 2010 the second eruption of Eyjafjallajökull was explosive. It was ten to twenty times larger than the previous one in Fimmvörðuháls and ejected fine, glass-rich ash 10 kilometres into the atmosphere. An estimated 750 tonnes of magma was ejected from the volcano every second and 800 people were evacuated. Unlike the earlier eruption, it originated from the top of the crater beneath glacial ice and caused:
 - the cold water from melted ice chilling the lava. This caused the lava to fragment into abrasive glass-rich ash particles. These particles were carried into the air (eruption plume).
 - the eruption plume, directly under the Jet Stream, carried the ash into the heavily used airspace over north and central Europe.

Also large quantities of dry volcanic ash lying on the ground were lifted up as 'ash mist' by winds, reducing visibility and making web camera observations of the volcano impossible.

- 20 April, most of the ice in the crater appeared to have melted. The plume only reaching heights of up to 4km and the amount of material ejected into the plume had decreased. As the amount of ice available to interact with the magma decreased, the volcano changed from producing ash to mainly producing fire fountains.
- End of April explosive activity had virtually ended, with a weak plume largely made up of steam, but flowing lava had advanced a few kilometres northwards from the crater.
- 23rd May, the London Volcanic Ash Advisory Commission declared the eruption had stopped but was continuing to monitor the volcano.

Satellite image

Changes to places: disruptive air travel

A combination of the following factors was responsible for the volcanoes disruptive power to air travel:

- volcano's location directly under the Jet Stream.
- direction of the Jet Stream was stable at the time, maintaining a continuous south-easterly direction.
- eruption took place under 200m of glacial ice. About 25 per cent of 1 km³ of ice in the summit crater was melted in the first two days of the eruption. The resulting melt water flowed back into the erupting volcano creating two phenomena:
 - the rapidly vapourising water increased the eruption's explosive power.
 - the erupting lava cooled rapidly creating a cloud of highly abrasive, glass-rich ash.

Without the combination of these factors, the eruption of Eyjafjallajökull would have been a medium sized, nondescript eruption, only providing interest to the scientific community and those living in the immediate vicinity.

Map of extent of volcanic ash



Source: www.heraldscotland.com/polopoly_fs/ volcanic-ash-map-7.2343!AshMap.jpg



Source: http://tucsoncitizen.com/wryheat/2010/04/16/ geologic-setting-of-icelandic-volcanoes/

Places linked: Katla volcano

Eyjafjallajökull lies 25 km west of another subglacial volcano, Katla. This volcano, under the Mýrdalsjökull ice cap, is more active, known for its powerful subglacial eruptions as well as its large magma chamber. Each of the eruptions of Eyjafjallajökull in 920, 1612, and 1821–1823 has preceded an eruption of Katla. By 15 July 2010 Katla had not displayed any unusual activity (such as expansion of the crust or seismic activity) since the 2010 eruptions of Eyjafjallajökull, though geologists are concerned about the instability of the larger volcano since 1999.

Map: Location of Eyjafjallajökull and Katla



Source: www.skimountaineer.com/ROF/Beyond/Europe/ IcelandMapLarge.gif

Hard rain of abrasive particles

Volcanic ash consists of small tephra, which are bits of sharp edged pulverised rock and glass created by volcanic eruptions, ranging from 0.001 millimetres (comparable to baby powder) to two millimetres (coarse grit).

Volcanic ash is formed by the following three processes:

- gas released under decompression causing magmatic eruptions
- thermal contraction from chilling on contact with water causing phreatomagmatic eruptions
- ejection of entrained particles during steam eruptions causing phreatic eruptions.

Volcanic ash can lead to: breathing problems; malfunctions in machinery such as in aircrafts; alter weather patterns; threaten health of livestock; and interrupt power generation and telecommunications. Also wind can carry ash thousands of kilometres away, affecting a larger area and a greater number of people. Even after ash producing eruptions have ended, wind and human activity can stir up fallen ash for years, presenting a long term health and economic hazard.

Ash deposited on the ground after an eruption is known as ashfall and over geologic time, the ejection of large quantities of ash can produce an ash cone. A fall of 300 millimetres leads to the death of most vegetation, livestock, and the wiping out of aquatic life in nearby lakes and rivers.

When ash falls it may be so dense that daylight turns the sky grey to pitch black. A darkened ash sky lowers temperatures during daylight hours. Loud thunder, lightning, as well as the strong smell of sulphur accompany an ashfall. If rain accompanies an ashfall, the tiny particles turn into slippery mud. Rain and lightning combined with ash can lead to power outages and breakdowns of communication.

Volcanic ash particles exist in the troposphere for a few weeks and the finest tephra particles remain in the stratosphere for a few months. They have only minor climatic effects. The major climate influence is caused by gaseous sulphur compounds, chiefly sulphur dioxide, which reacts with OH and water in the stratosphere to create sulphate aerosols with a residence time of about 2–3 years.

Impacts of volcanic ash on flying

Aircrafts tend to avoid airspace that has volcanic ash as jet engines act like giant vacuum cleaners. If they are flying through a volcanic ash cloud, the engines suck in the ash posing a health threat to passengers. The ash also damages engines and melts or vaporises in the engine's combustion chamber. The molten ash can coat the turbine blades like spray paint, disturbing the normal air flow and possibly causing the engines to shut down. About 100 aircraft have come into contact with volcanic ash from 1983 to 2000. That, in turn, can be catastrophic as experienced by the crew on the following flights:

After the 1982 Galunggung, Indonesia volcanic eruption, a British Airways plane flight from Kuala Lumpur to Perth, Australia, flew through an ash cloud. All four engines cut out and the plane descended from 11,000m to 3,700m, before the engines were restarted. In 1989 a KLM Boeing 747 flying from Amsterdam to Anchorage encountered similar problems near Mount Redoubt (Alaska). The damage was \$80 million and there was 80kg of ash in each turbine.

In April 2010, airspace over Europe was closed due to the presence of volcanic ash in the upper atmosphere from the eruption of Eyjafjallajökull. The volcanic plume was thrown into the atmosphere between 6km and 11km, corresponding to the flying height of most aeroplanes. On 15 April the Finnish Air Force halted training flights when damage was found from volcanic dust in the engines of one of its Boeing F-18 Hornet fighters. On 22 April the UK RAF Typhoon training flights were also temporarily suspended after deposits of volcanic ash were found in the engines. This was not the only problem. Ash can pit the

windscreens of the pilot's cabin and reduce visibility and coat the plane so it becomes tail-heavy. Ash on runways can be thrown into the air during takeoffs and landings. The engines suck in the ash creating damage to moving parts. Considering these safety issues the measures taken by the airline industry to clear airspace was considered a sensible precaution.

Volcanic ash in the vicinity of the eruption plume has larger particle size range and density to that found in downwind dispersal clouds, which contain finer ash. The level of ash loading which catastrophically affects engine operations has not been established, beyond the knowledge that high ash densities must exist for this to occur. Whether silicamelt risk remains at lower ash densities characteristic of downstream ash clouds is currently unclear. Until this has been determined preventive risk-management strategies is important.

The increasing numbers of airplane incidents from atmospheric ash led to the creation of Volcanic Ash Advisory Centres which serve as liaisons between meteorologists, volcanologists, and the aviation industry. In June 2010, Easyjet an airline company, unveiled a system to allow airlines to safely fly around ash clouds.

Impacts on place: ice caps melt

Eyjafjallajökull is one of the smaller ice caps on Iceland, situated to the north of Skógar and to the west of Mýrdalsjökull. The ice cap covers the caldera of the volcano (1,666 metres) and an area of 100 square kilometres, feeding many glaciers. The main outlet glaciers are to the north; Gígjökull, flowing into Lónið, and Steinholtsjökull, flowing into Steinholtslón. The melting of the glaciers caused rivers to flood over low lying agricultural land in south Iceland

Photograph of Eyjafjallajökull Glacier taken on 29 August 2009



Source: http://en.wikipedia.org/wiki/ File:Eyjafjallaj%C3%B6kull_Glacier_-_29.8.09.jpg

Flooding caused by a volcanic eruption at Eyjafjalla Glacier in southern Iceland April 14, 2010.



Photograph: REUTERS/Icelandic Coast Guard/Arni Saeberg. Source: www.boston.com/bigpicture/2010/04/icelands_disruptive_volcano.html

A man takes a picture of a road that has been washed away by flood water following the melting of the Eyjafjalla glacier due to the eruption of a volcano on April 14, 2010 near Reykjavik.



Photograph: HALLDOR KOLBEINS/AFP/Getty Images Source: www.boston.com/bigpicture/2010/04/icelands_ disruptive_volcano.html

Comparisons and similarities between places

The magnitude of the erupting Eyjafjallajökull was VEI 4 which was not large compared to 1980 Mount St. Helens eruption of VEI 5, and the 1991 Mount Pinatubo was VEI 6.

Other recent impacts to airlines from volcanic ash have occurred with little media coverage:

- 2009 Redoubt, Alaska eruption: between March 22 and April 5 the eruption resulted in 60 re-routes, 20 diversions, and 10 turn backs with many night operations into Anchorage cancelled.
- **2009 Sarychev Peak, Kuriles, Russia eruption:** between June 12 and 15 the eruption resulted in 65 reroutes, 6 diversions, 2 turnbacks, and 12 unscheduled fuel stops.

The recent eruptions of Eyjafjallajökull were not unparalleled in either volume or abundance. Neither phase of the eruption was unusually powerful (VE1 4). Other notable volcanic eruptions in recent years include the eruption of the 1991 Mount Pinatubo (VEI 6). This eruption lasted 8 days and resulted in worldwide abnormal weather patterns and a decrease in global temperature over the next few years. However, the second phase of Eyjafjallajökull's eruption lasted longer than that of Mount Pinatubo.

According to the USGS Weekly Volcanic Activity Report (14–20 April 2010) the second eruption phase at Eyjafjallajökull coincided with eruptions at a number of other volcanoes, including new activity at:

- 19 April Barren Island, Andaman, India, plume rose to an altitude of 2.4 kilometres and drifted 55 kilometres to the north.
- from 13–16 and 19–21 April in Gaua, Banks Islands, Vanuatu – ash plumes rose to altitudes of 3 kilometres.

Most of the aircraft damaged by ash from the 1991 Mount Pinatubo eruption in the Philippines were more than 950 kilometres away. Ash from the eruption drifted eastward more than 8,000 kilometres and was found on the east coast of Africa.

Globalisation of the volcanic eruption

Cross-border exchange of ash – share the global commons (atmosphere)

Change in global transport – air transport eg. A380 no longer flying. Alternatives: travel by road, rail and ship.

Reduced global movement – goods (trade); people (migration, labour, tourism)

Improved global technology – monitoring volcano and atmosphere – satellite

Increasing power and voice (local-global citizenship). Protests – *Open Airports!!* Airports, tourism, agriculture and industrial businesses – money versus

Increasing influence of global media networks. Instantaneous flow of information between nations (cable TV, Internet)

By the fourth day, more than 63,000 flights cancelled in 23 European countries, stifling the lifeblood of the continent's economy.



Cleese hails a cab



Monty Python comedian John Cleese opted for a 1,500-kilometre trip from Oslo to Brussels. In a Mercedes taxi it cost \$5,100 and took 15 hours. It went through Norway, Sweden, Denmark, Germany, Netherlands and Belgium.

Places are linked: Kenya

When the Iceland volcano erupted most Kenyans viewed it as another sad phenomenon affecting a faraway land. But when airports across the world shut down Kenya's horticulture industry spiralled down.

All of a sudden, no matter how disparately human beings are scattered, they are interlinked. While other countries were worried their citizens were stranded in foreign airports Kenyans were concerned about the effects on the hundreds and thousands of labourers who depend on the exports of horticulture for their livelihood. About one million kilograms of fresh produce is exported out of Kenya every night. More than a third is exported to Britain.

- Horticulture employs thousands of people
- Workers laid off:
 - roses, lilies and carnations wilted
 - no local use, flowers thrown into compost pit

A worker packs roses at one of 30 flower farms around Lake Naivasha, Kenya



Photgraph: Marco Longari/AFP. Source: www.guardian.co.uk/ commentisfree/2010/apr/20/iceland-volcano-kenya-flight

- vegetables baby corn, courgettes, broccoli, green beans and carrots left to rot. Some fed to cows.
- Horticultural industry:
- lost \$3m a day.
- main currency earner in Kenya
- 2009 raked in \$924m
- flowers: 20% of nation's exports.
- over 3,000 tonnes of flowers perished.
- Kenya Airways, lost \$1m a day. Airline's busiest route is London, where it flies every day.
- coastal town of Mombasa, hotels grappled with stranded visitors. The small number of tourists who visit the area was down to a trickle as most come from places where airports have been closed.
- people stacking supermarket shelves with Kenyan products claimed the clouds of volcanic ash had disappeared so they did not lose their jobs.

Perspectives

Winners	Losers	lssues
Winners Transport High demand for land and sea transport across Europe Eurostar – over 50,000 extra passengers during first weekend of disruption National and international rail services fully booked – many putting on	Losers Salmon and flowers – two of many products transported through Europe to destinations around world. Many restaurants, supermarkets and florists did not get their shipments. New York City's Flower District – friday night flights from Netherlands are a big deal. Thousands of dollars worth of tulips, daffodils and hundreds of other varieties come in by air, to be distributed on Saturday morning. The weekend's weddings did not have Dutch flowers. Automaker Nissan – suspended some production at its factories in Tennessee and Mississippi. The culprit was lack of pneumatic sensors made in Ireland	Issues Norwegian Prime Minister – Jens Stoltenberg en route home from New York, didn't get off the runway. Used iPad to govern from a distance Funeral plans – guest list for Poland's state funeral for late president Lech Kaczynski and his wife Maria in Krakow was uncertain. They died when their plane crashed in Russia. Barack
additional services Ferry services fully booked. Car and coach hire and taxi firms benefitted		War Zones – closure of German airspace affected the air bridge between North American and the wars in Afghanistan and Iraq. Transport aircraft carrying soldiers and supplies to and from Afghanistan and Iraq flew via Spain rather than by Germany

Australia – vulnerable flights

Beneath the aviation corridors linking Australia to Asia and Europe, is Indonesia, which has more active volcanoes than any other country. A cataclysmic eruption could cause major disruptions to international air traffic, tourism and trade.

Darwin has one of nine global ash monitoring centres which track volcano activity and advises airlines on current risks around the world. In 2009 it issued over 1700 advisories to airlines on threats from active volcanoes in the region. The Bureau of Meteorology specialist who runs it, Dr Andrew Tupper, says it is 'virtually impossible to fly in and out of Australia without going over volcanic activity'.

Even though the ash monitoring system has proven effective, two risks remain:

- insufficient warning to airlines as a result of a surprise eruption from an unknown or unmonitored volcano
- a cataclysmic eruption, such as the 1883 Krakatoa incident, which could create an ash plume so large it could be difficult to navigate around



Tourists watch lava spurt from Eyjafjallajökull on March 27, 2010. Up to 800 people were evacuated in Iceland on April 14, 2010 due to the volcano eruption.

Photograph: HALLDOR KOLBEINS/AFP/Getty Images. Source: www.boston.com/bigpicture/2010/04/icelands_disruptive_volcano.html

Impacts on global weather

Volcanic eruptions have been known to lower global temperatures, but it is unlikely the Eyjafjallajokull eruption will have any impact. Atmospheric scientist Brian Toon at the University of Colorado said NASA's satellite measured the amount of sulphur dioxide the volcano emitted and noted it posed no threat to world climate.

Iceland – Laki

In 1783 a volcanic fissure in Iceland called Laki erupted violently. The sulphur dioxide gases in its plume resulted in increased deaths over Europe over the next few months. This impact was minimal compared to its impact on climate. The 1784 winter was one of the coldest on record in Europe and North America. Laki, along with another Icelandic eruption shortly after, had severe effects on crops in France over the next few years, which some say may have been a contributing factor in the 1789 French Revolution.

Indonesia – Mount Tambora

The 1815 eruption of Mount Tambora in Indonesia caused the northern hemisphere to experience 'The Year without a Summer' in 1816. Famine was widespread in the U.S. and Europe, and — less importantly, but interestingly — the lousy summer caused Mary Shelley and John Polidori (and their friends) to stay indoors while on vacation, resulting in the novel Frankenstein and the short story The Vampyre.

Source: www.wired.com/geekdad/2010/04/6-questions-andanswers-about-the-iceland-volcanic-ash-cloud/ In the 1780s and 1810s, nobody had the slightest idea what was causing the extreme weather conditions. Today we are fortunate to possess advanced technology that allows us to track volcanic plumes and assist in gauging its meteorological effects.

Global warming

There was no sign, the eruption from below the Eyjafjallajokull glacier, was linked to global warming as the glacier is too small and light to affect local geology. Others disagree and believe the reduction of ice due to climate change could have contributed to triggering the latest eruption.

Global warming melts ice and this can influence magmatic systems. The end of the Ice Age 10,000 years ago coincided with a surge in volcanic activity in Iceland, apparently because huge ice caps thinned and the land rose. A thaw of Iceland's ice caps in coming decades caused by climate change may trigger more volcanic eruptions by removing a huge weight and freeing magma from deep below ground.

Carolina Pagli, a geophysicist at the University of Leeds in England, said there were risks climate change could also trigger volcanic eruptions or earthquakes in places such as Mount Erebus in Antarctica, the Aleutian islands of Alaska or Patagonia in South America.

Diagram: Impact of planes and a volcano in emitting CO2



Future planning

Interdependence has existed since the beginning of history. Traders used the Silk Road or travelled via ship between countries. In the 21st Century, countries have become increasingly more reliant upon one another. Reports on the suspension of flights and the stories of stranded passengers demonstrated the extent of interdependence in the world today. Tourist resorts in the Middle East rely on millions of people for their livelihood, and counted the days until the flights resumed

Today when there is a disruption in airflights in Europe, this becomes a major global problem, as it is the biggest exporter in the world and the second biggest importer. While most global trade is transported by container ships, goods still cross the world via air. For example after the Icelandic volcanic eruption cancelled flights from Europe, the automaker Nissan was forced to suspend some production at its factories in Tennessee and Mississippi. The culprit was lack of pneumatic sensors made in Ireland.

In a globalised, interdependent world it's hard to build redundancy into the vital networks that move people, goods, and services around the world. Manufacturers can't fully equip factories on standby, with workers on call, in case an epidemic in China halts exports. It would cost too much. Also it is impossible to build an adequate level of transport redundancy. Europe's extensive system of trains and ferries could not handle the flood of traffic that materialised when aircraft were grounded. Fights from the United States to India via London could have been rerouted through airports in Africa. But Dakar Airport in Senegal doesn't have the capacity (runways, air controllers, ground crews) to maintain and call into action the next time Heathrow shuts down.

As atmospheric disturbances closed some trading networks new ones opened. For example Cisco and Tandberg showed virtual meetings substituted face-to-face meetings during the air transport shutdown.



In today's globalised world, our lives are more inextricably linked than ever before. World's economy works at different levels-from personal, local, national, regional to international. Like layers of an onion, they are separate but part of a whole, each affecting the other.

Activities

You Tube –

www.youtube.com/watch?v=f1ztg0wUqKY www.youtube.com/watch?v=m2YGJppt8jo&feature=fvw

Inquiry skills

Refer to Google Earth: Measure the distance of the Eyjafjallajökull from London and Paris.

Refer to the Internet and collect satellite images and photographs of the Eyjafjallajökull eruption in 2010. Explain the biophysical environment and how it is constantly changing.

Understanding place

- Where is this place?
- What are the biophysical characteristics of this place?
- Why is this place unique?
- How is this place connected to other places? (links)
- How and why is this place changing?
- Explain the spatial distribution of volcanoes.
- Discuss the similarities and differences between the Eyjafjallajokull volcanic explosion in 2010 and other volcanic eruptions
- Places are both local and global. What does this mean?

Geographical questions

- What 'awoke' after nearly 200 years of 'sleep' on 20 March 2010
- Why were thousands of flights cancelled?
- Where did volcanic ash coat the ground?
- Why can this occur again?
- How did this eruption affect the airline industry and the world economy?
- How do you think you would cope if you were stranded indefinitely somewhere far from home?

- Why do you think the eruption has caused a feeling of 'helplessness'?
- Why do you think this volcanic eruption has given us a 'visceral awareness of our interconnected world'?
- Do you agree that 'our lives are still at the sufferance of nature'? Why or why not?

Short responses

- Describe how a local event had a global impact.
- Explain the fragility of our interconnected world.
- Create a visual representation of the global impacts of the eruption e.g. using maps, satellite images and newspaper articles.
- Explain the negative impacts of the eruption (e.g. changes in regional weather, travel across the world, the world economy, public health, military operations and local agriculture).
- Explain why a force of nature that caused no deaths had such a widespread impact.
- Group work: Students identify stories from around the world of people, organisations, businesses, weather patterns, events, politics and governments affected by the eruption of Eyjafjallajokull. Locate these stories on a world map. Then with yarn indicate how the people or groups in the stories were connected to other people, groups and places around the world. For example, if perfume from Paris to New York was cancelled because of the eruption, the yarn will connect Paris and New York as well as Paris and Iceland.
- List the positive effects of the volcanic eruption.
- Explain the difference between divergent plate boundaries (Iceland) and convergent plate boundaries (Pacific Ring of Fire).
- Volcanoes operate on different timescales and eventually the region will be due a big one. Research this statement.

Complete the table from the notes in the article

Global	Regional: Europe	National	Local: Iceland
A large ash cloud from a volcanic eruption in Iceland grounded hundreds of European and transatlantic flights. It also stranded and delayed millions of passengers – even Australians. Movement of people, trade and commerce were affected	International Air Travel Association reported airlines lost \$1.7 billion due to shutdowns in Europe	Kenya: Adverse impact on horticulture and flower industries USA South America Australia China Japan	Farmers across the region where the volcano erupted, under the Eyjafjallajökull glacier, scrambled to protect their herds from inhaling or ingesting ash, which can cause internal bleeding, long-term bone damage and loss of teeth. Lava also destroys and burns crops, plants and trees. This event was a major disaster for farmers Agriculture is important in this region. Farmers near the volcano were warned not to let their livestock drink from contaminated streams and water sources, as high concentrations of fluoride can have deadly renal and hepatic effects, particularly in sheep. The thick layer of ash on some Icelandic farms and pastures at Raufarfell became wet and compacted, making it difficult to farm, harvest or graze livestock.

Executive Summary

Environmentalists fall into two groups: those who think we are hopelessly entangled in an utter catastrophe of our own making and those who think we have the technical know-how to cope or adapt to the future we have created. This research paper is devised with the latter in mind and explores the theory around waste not existing in the future. It also reviews opposing environmental discourses around the current issues and whether global legislation is the way to achieve this theory in the future.

Introduction

This paper is not going to discuss *if* the human species is causing global warming or any other environmental degradation – the author feels that this discussion can be assumed as concluded due to a vast array of supporting literature and research available. This paper will focus on the next step – assuming humans are the absolute cause of climate change and discussing the idea that legislation is the foundation for environmental control of Carbon Dioxide (CO_2) emissions.

With the vast amounts of CO_2 , among other greenhouse gases, being emitted into the atmosphere and the vast amount of natural CO_2 absorbing forests that are being removed from the Earth's surface – there needs to be a solution that is palatable for all of us, and that includes more than just the human species, all earth's species.

The real concern that faces us today is how do we deal with this issue if it has been around for so long? What could be done differently today, that could not be done 100 years ago? The world has matured to more than just countries coincidently located within sailing distance of one-another, with the general consensus still being that there are plenty more countries just like us and plenty more planets just like us, that we just haven't discovered. This is now commonly understood to be inaccurate and hence the dilemma of now needing to look after the one country we have and of course look after the one planet we have for the sake of the human race now and in the future.¹

Furthermore, how does population growth fundamentally link with the cause of climate change? Is this issue the only one we need to solve in order to reduce CO_2 emissions or is there more to do? If we reduce the population, perhaps we can reduce the temperature of the globe, but how? Are legislative frameworks the answer? What type of legislation is the answer? Do we need to lose our way-of-life in order to save the world? Maybe there is a way to maintain the population if we learn how to fit into the global ecosystem, not just analyse and monitor its demise from the outside. The concept of 'waste equals food' comes from nature

Cate Field, Bond University Student in Carbon Management Certificate



Photograph courtesy of AusAid. Source: www.flickr.com/photos/ausaid_photolibrary/sets/

itself – there is a possibility that the human species could morph back into the ecosystem with this theory and not have to lose the unfettered behaviour of consumerism that we have come to love.²

The Current Problem

Scientists and environmentally concerned authors have been writing about the unsustainability of human behaviour for centuries. Only in the last twenty to fifty years has any of it been taken seriously, but still minimal change has taken place. A lot of talk, but not a lot of action. It would appear that the task is either too daunting, or perhaps the sceptics are convincing the greater community that there is nothing to worry about.

There is a large electronic movement around the theory that climate change and CO_2 emissions are in direct correlation with population growth. CO_2 has been a fluctuating gas since the earth began, but the environment that we have on the earth today requires the gas to remain at certain levels to sustain the current ecosystem. The

Optimum Population Trust is one of the infamous global groups that spread their population-equals-climate-change theory via the internet as shown in the excerpt below from their website:³

Climate change and population

Key points

- Continuous population growth, fuelled by an expected increase of 2.3 billion people on the planet by 2050, is multiplying the impacts of climate change and will be ecologically unsustainable.
- In a world of weather extremes, where land is being lost due to rising temperatures, desertification, floods and rising sea levels, the world will not be able to feed, water and sustain even its current 6.8 billion population.
- As people are forced off their land by climate change, mass migration movements may be joined by up to 200m environmental refugees. The poorest peoples will be most affected.
- Although northern temperate climates may benefit in the short term, they too will be affected adversely by climate change.
- Under these circumstances, Europe and the UK will suffer climate change impacts, and will be in no position to sustain larger populations, whether by increasing birth rates or accepting greater migration flows.
- Stabilisation and decrease of populations, globally and nationally, by encouraging lower fertility and balanced migration, is an essential component of policies to mitigate and adapt to climate change, and urgent action is needed.

As far back as 1798, Thomas Robert Malthus aptly identified that if the population is to continue to grow exponentially, then the finite resources that the earth contains are not going to sustain our way of life.⁴ This theory has been rehashed many, many times and has been able to obtain some sizeable air time in the last 50 years. Many feel the environmental voice was reignited with Rachel Carson's *Silent Spring* in 1962, the coals were continually stoked again with Paul Ehrlich's *The Population Bomb* in 1968 and *The Population Explosion* in 1984, Dennis & Donella Meadow's *The Limits to Growth* in 1972 and followed up by *Beyond the Limits* in 1992.

These are just a few authors that have been renowned for their public voice on the topic and yet with such global awareness of these books and many more, we can still note the growth of the human population has occurred just as Malthus said it would more than 200 years ago. It needs to be emphasised again that as far back as 1798 the concerns of population growth have been known, but more that 200 years have passed us and our population has grown to nearly 7 billion people, nearly 10 times its size since the mid 18th century as shown in the following table (two sources):⁵

	World Population	Year	World Population
1750	791,000,000	1750	700 million
1800	978,000,000	1804	1 billion
1850	1,262,000,000	1850	1.2 billion
1900	1,650,000,000	1900	1.6 billion
1950	2,519,000,000	1927	2 billion
1955	2,756,000,000	1950	2.55 billion
1960	2,982,000,000	1955	2.8 billion
1965	3,335,000,000	1960	3 billion
1970	3,692,000,000	1965	3.3 billion
1975	4,068,000,000	1970	3.7 billion
1980	4,435,000,000	1975	4 billion
1985	4,831,000,000	1980	4.5 billion
1990	5,263,000,000	1985	4.85 billion
1995	5,674,000,000	1990	5.3 billion
2000	6,070,000,000	1995	5.7 billion
2005	6,454,000,000	1999	6 billion
July 1 2008	6,707,000,000	2006	6.5 billion
		2009	6.8 billion

In *The Population Explosion*,⁶ Ehrlich summarises how China publicly acknowledged in the 1960s that population growth was of concern to their nation, but continued to let societal judgement on the matter take precedence, which meant that freedom of choice continued to grow their birth rate. By 1979 the government identified that growth rates had not declined and it introduced the onechild policy that limited the birth-rate to a maximum of two children with more than half the couples in the country limited to one child. In conclusion Ehrlich acknowledges even in a regimented society such as China with a repressive government, the lesson learned is that the policy started too late. In the democratic country of India, they have been encouraging 'family planning' since the 1950s but without a dictatorship to enforce change, they have been very unsuccessful to making any noticeable change in their birth rate. Plus, the declining death rate with improving health care would continue to put more pressure on strained resources.

However, there are more recent unpublished theories on the internet purporting that population growth being linked to climate change is a myth:⁷

Between 1980 and 2005, for example, Sub-Saharan Africa produced 18.5% of the world's population growth and just 2.4% of the growth in CO2. North America turned out 4% of the extra people, but 14% of the extra emissions. Sixtythree per cent of the world's population growth happened in places with very low emissions.

Looking at the graph below, produced by the United Nations⁸ it would support the above theory – central Africa, India, and South America, all have far less emissions than Australia and certainly have a far greater population.



So, population growth is not unanimously accepted as the sole cause of CO₂ emissions or any other environmental degradation, but the manner in which our population is growing definitely is. Society has become the uninvited dinner guest since the industrial revolution, that arrives to eat all the food with out any understanding of the table manners required in the household, and then leaves without any consideration for the mess they have made and oblivious to the washing up that will need to occur after their departure. Again, the dinner guests (population) may not be the problem, just the manner in which they conduct themselves. The way our societies use resources as if they are magically going to replace themselves, and the way they emit CO₂ emissions as if they will magically be absorbed by something other than the remaining flora, is the real problem.6

Whilst the growing understanding of these issues emerges in the general community, it is too late for society to deal with this by generational change and it is too great a problem for any single person, town, country or global region to fix on their own. The issues that face us today require a holistic and all encompassing global piece of legislation – with punishment in the form of financial isolation, because our current society knows no other way of measuring happiness or success, and as succinctly put by Schumacher in his book *Small Is Beautiful: A Study of Economics as if People Mattered*:⁹

[T]he acquisition of wealth have thus become the highest goals of the modern world in relation to which all other

goals, no matter how much lip-service may still be paid to them, have come to take second place. The highest goals require no justification; all secondary goals have finally to justify themselves in terms of the service their attainment renders to the attainment of the highest.

As recalled by Braungart & McDonough₂: during the Exxon Valdez disaster in 1991, the Alaskan government pleasantly reported excellent GDP – solely related to the economic activity boost the clean up presented – but made no mention to the forecastable downturn in GDP that would subsequently be bestowed upon them in generations to come from the loss of natural resources, the paralysed fishing industry and stalled tourism industry.

Legislation as the Answer

If the generation gone before have not been able to change with just the knowledge that they should, then what more can be done to curve the behaviour of every cultural variant of society that exists on the earth today? The modern world is no longer commercially isolated or geographically limited. We can be on the other side of the world in less than 24 hours – but these luxuries of the modern world have mostly come at the expense of the environment, and the era is upon us to repay the debt while we can unify the entire world's population better than we have ever been capable of.

The postulata in this paper is for globally binding legislation to be the answer for how we repay this debt,

and this section will discuss the opportunities and challenges surrounding it, or if there are any other options available to us in the modern world.

Miguel Santos, author of Managing Planet Earth,1 introduces two valid points in regards to the challenges global legislation faces; challenges that any environmental law whether local or global would face when evolving 'from the rhetoric of environmental concerns'. Issues surrounding scientific uncertainty, and issues with the limitations of any law to impose a change, rather than just impose penalties. Countries may challenge legislation, if required changes are not justified, considering the scientific results are not unanimous. They may also favour paying the 'penalties' as a cheaper alternative to actually changing practices, letting market forces play the controlling card in whether the world prevents climate change. In *Cradle to Cradle*,² the authors recall a story where the local council was fining a local resident for gardening practices that were prohibited by a bylaw. These 'fines' were seen by the resident as more of a 'levy' to continue with the garden practices in the same way, and the annual payments were made for years and years without hesitation. Thus the success of the legislation is very dependant on the type and manner in which it is implemented, and Santos notes in conclusion that he firmly believes:

[T]hat nations must and will cooperate to solve the international ecological problem and ... The dynamics of the global commons will eventually lead to an effective instrument for the development (through legislation) and the enforcement (through implementation) of an optimum population/pollution for each nation and for the world as a whole.²

Furthermore Santos acknowledges that science is merely there for 'risk assessment' and that the role of the legislator is one of 'risk management', which does not necessarily require a crystal ball into the future, but does require the ability to manage any proposed risks that might arise, as suggested by the plethora of risk assessments that have been completed.¹ Cyrille Klemm, et al, discuss this same theory in a paper they presented called Conserving Biological Diversity: The Legal and Institutional Issues,¹⁰ in which they acknowledge 'the importance of the precautionary approach' as the driver for legislation and note that a 'lack of full scientific certainty should not be used as a reason for postponing' any action. If environmental change is to be minimised, legal frameworks must precede climate change, not wait until the evidence is blinding before action is taken.

Others advocate that the market should and could replace environmental legislation and do a better job of achieving the end goal faster and more effectively. Speth and Haas identify this theory under the banner of Natural Capitalism in *Global Environmental Governance*.¹¹ They explain how market forces that use true or full cost prices to reflect the environmental cost of the product or service, would also evoke redesigning industrial systems to mimic biological ones, so that even the concept of waste is progressively eliminated. This echoes the mantra of the 'Cradle to Cradle theory' that Braungart and McDonough have preached for more than 20 years. This theory will be expanded upon in the last section of this paper.²

Dryzek, author of *The Politics of the Earth: Environmental Discourses*,¹² theorises that there are only three options ahead of us and that they all use the same goal of problem-solving in a variety of executions:

The three main ways to coordinate such efforts are by bureaucracy, democracy, and markets. Corresponding to these three coordinated mechanisms are the three discourses: administrative rationalism, democratic pragmatism, and economic rationalism.

Even though he details these as options, Dryzek later returns to point out that they are not actually alternates, but instead phases in which 'administrative rationalism [comes] first because it captures the dominant governmental response to the initial onset of environmental crises, democratic pragmatism soon emerges as a corrective to administration. And economic rationalism builds on its advance in all areas of political life to generate alternatives to and remedies for the pathologies it identifies in both administrative and liberal democratic governance'.¹²

Type of Legislation Required

Most environmental legislation is dominated by concept of reduction (e.g.: Carbon Pollution Reduction Scheme), but what if all environmental legislation focused on the concept of growth instead? The Australian Federal Renewable Energy Target (RET) scheme under the Renewable Energy (Electricity) Act 2000 (Cth), is an example of growth promotion. It provides the direction for where we are trying to head. It omits to focus on what current activities are bad that need reduction. Legislation that identifies the goal of "good", not "less bad", is the theory that Braungart & McDonough dedicate an entire chapter to in the book Cradle to Cradle.² As a way of social existence humans always respond better to positive criticism rather than negative criticism because of the fact that it allows them to focuses on the direction they should be heading and not dwell on the failure to achieve this in the first place.

In *Limits to Growth: The 30 Year Update*, ¹³ the authors explain that a 'sustainable world would not and could not be a rigid one, with population or production... But rules for sustainability, like every workable social rule, would need to be put in place not to destroy freedoms, but to create freedoms or to protect them.' It must therefore identify where we are aiming to be in 50 years and set up the framework for achieving this now. It must focus on where we need to be, not where we have been. It must provide guidance in the least risk direction and not focus on the disputable facts of current issues.

Advancing positive societal behaviours is easier to do than reducing negative behaviours because the efforts are all focused on the direction that needs to be taken and doesn't

involve back-tracking in order to find the right path. The following two paragraphs show two examples of this.

Public campaigns to plant trees have been so successful because there is minimal focus on stopping deforestation, just on reforestation which is the positive activity and easier to accomplish. There are many public campaigns in the world focussed on planting a million trees or even a billion (such as UNEP, The Nature Conservancy, Environmental Partnership, just to name a few), but these campaigns are predominantly being motivated and advocated by NGOs: http://www.unep.org/ billiontreecampaign/; http://www.milliontreecampaign. com/; http://www.plantabillion.org/; http://www. plantamillion.org/. There is an opportunity here for global legislation to require all countries to maintain a quota of land that is dedicated to old growth forests and also dedicated to new plantations.

Government rebate programs that promote a required outcome are so successful these days that they have to be cancelled – when does an abatement or activity reduction program need to be cancelled due to its unparalleled success? Early in 2009 the:

Federal Government announced the early and sudden termination of solar rebates under its incredibly successful Solar Homes and Communities Plan... it was closed without warning on June 9.¹⁴



The table above¹⁵ shows the unprecedented growth that will account for roughly 100 megawatts of annual energy by the time the scheme completes the outstanding instalments, and since 1 megawatt is the equivalent power usage of 1000 homes per annum, this project will produce enough renewable energy to power in excess of 100,000 homes in Australia which is approximately 1%, and hence reducing the amount of CO₂ emission emitted. ¹⁶ When Harrington presented his paper back in 1999 on behalf of the Australian Greenhouse Office (AGO), on the emerging renewable energy industry in Australia to the World Energy Congress¹⁷ he described the success of the challenge ahead as being reliant on the Commonwealth commitment being 'matched by industry and the wider community. One has to wonder if he, or the audience, predicted how positive growth legislation would have such a different outcome to typical negative reduction legislation.

An alternative environmental dialogue emphasises that without deeper societal changes, all of this effort will be futile. Speth & Haas note in *Global Environmental Governance*¹¹ that 'some tend to see the causes of international environmental decline as deriving from structural factors having to do with economic inequality, an absence of political representation, and undeveloped environmental sensibilities among the majority of the world's population' so what we need is not environmental law, but societal law to fix global warming. They also refer to several modern authors and environmental observers that all conclude three thoughts:

- 1) global environmental conditions are steadily worsening;
- 2) current efforts to address them are inadequate, and
- major new initiatives are needed, and these initiatives should address the underlying drivers of deterioration – the root causes.

Hassan also points out in his address to the convention Biodiversity Conservation in the Asia and Pacific Region: Constraints and Opportunities,¹⁸ that:

[U]nlike much of international law, international environmental law has economic underpinnings throughout. Each norm or each environmental convention requires States to make financial commitments or forego economic opportunities. Thus while allowing a citizen the right to speech under a Human Rights Treaty would not ordinarily entail financial obligations, the obligation under an Environmental Treaty to allow economic activities only after an Environmental Impact Assessment [EIA] would require an investment in the requisite infrastructure.

In addition he notes, that if not implemented correctly 'there are serious possibilities that much of the emerging international environmental order will be still-born as far as the developing countries are concerned' as they have higher priorities of poverty and health, not to mention limited education and infrastructure to implement.¹⁸

If we can not improve the simple factors of health and poverty in the developing nations then we will struggle with improving the environment. As the author of *How* Many People Can the Earth Support,¹⁹ Cohen notes that the world has been very close to political discourse that could have led the world in the right direction. Cohen summarises that during Al Gore's presidential campaign, he preached five strategic environmental goals with three major approaches to achieving them. First approach focused on literacy and education, with emphasis on simple farming techniques being taught such as preventing soil erosion, planting trees and clean water supplies. Second, investment in programs that reduce infant mortality to break the cycle of people having multiple births to combat that lack of children making it to adulthood. Third, ensuring contraception availability and education around family planning are widely available. In summary, education is the key it seems to conquering most environmental issues. Hassan also echoes that 'of concern is the inadequate development of an environmental mind-set in the developing countries, and there needs to be a serious move to 'encourage environmental education and develop institutions and infrastructure to meet the challenges ahead.¹⁸

Whole New Concept

Cradle to Cradle is a whole new concept for the world to embrace, as it develops global goals and supporting legislation. Braungart and McDonough explain this concept in three simple words in their book *Cradle to Cradle*: Waste equals food.² Waste covers anything and everything that humans no longer use/desire in its current form. All waste needs to be captured and processed back into food for the next source. This concept sounds similar to recycling, but in fact it opposes that concept in its current form as they refer to it as 'downcycling' – their theory is one of 'upcycling'. Everything meets its new source as quality food, not rejected waste.

Food for the biological environment or food for the technical environment, everything on the earth is one of these. Technical is comprised anything that is not in the

biological ecosystem such as plastics and metals. So, if it is not food for nature, then it must be technical food for our industries and if the technical element does not have a current use, it needs to be stored until one becomes available (e.g. radio-active material). The authors² say 'to eliminate the concept of waste means to design things – products, packaging, and systems – from the very beginning on the understanding that waste does not exist'. This means that the focus is not on the capabilities of the end user to come up with a way to recycle the waste back into food, but on the designer to ensure the multiple lives of the materials are able to be easily transformed back into their biological or technical ecosystems, along with the basic instructions of which sphere they fit into.

So how does this theory relate to CO_2 ? If CO_2 is a biological food source, then it would seem that nothing more needs to be done to reduce emissions or say carboncapture-and-storage. But the ecosystem has been altered, and in this current ecosystem the amount of CO₂ being emitted is more food than the source can handle. So there are two options, reduce the amount of food, or increase the mouths to feed. Attention at this point will be drawn back to the discussion in the previous section around planting trees and how successful these projects have been in order to increase the source. Legislation has two positively directed options for this: compulsory research and development in new technology that does not emit CO₂ emissions, and compulsory increase of native flora for reforestation of the Earth. Both of these options focus on growth instead of reduction as discussed previously.

If we can couple positive global legislation around Cradle to Cradle production/design with education of the broader community, then we might just have a roadmap that will lead the world in the right direction. Speth & Haas note:¹¹

We urgently need a worldwide environmental revolution in technology – a rapid ecological modernization of industry and agriculture. The prescription is straightforward but challenging: the principal way to reduce pollution and resource consumption while achieving expected economic growth is to bring about a wholesale transformation in the technologies that today dominate manufacturing, energy, transportation and agriculture... The focus should be on 'dematerialising' the economy through a new generation of environmentally benign technologies that sharply reduce the consumption of natural resources and the generation of residual products per unit of economic output. The good news here is that across a wide front, technologies that would bring about a vast improvement are either available or soon can be.

Concluding Summation

In closing, the global society that exists today is very different from 200 years ago when our resources were first identified as finite. This society is equipped with the knowhow and technology to change the future path in front of us. Population growth is not the sole cause of increasing CO_2 emissions, but it will need to be managed with the

main focus being on our activities. This management will need to come in the form of global environmental legislation that:

- 1. Requires research and development to be undertaken and financed by developed nations for processes and actions that eliminate environmental degradation and implement the 'waste equals food' theory canvassed in this paper.
- 2. Requires sharing of knowledge and technology from developed nations to developing nations.
- 3. Requires education of environmental needs to be widespread at all levels of schooling and that employs risk management and the precautionary approach.
- 4. Requires the focus to be on the direction to take not the flawed choices taken.
- 5. Requires national legislation to focus on growth, not reduction; positive, not negative.
- 6. Requires the 'majority rules' approach to binding to all nations to the environmental legislation irrespective of their position.

... Creating the perfect world is going to require all of us to be actively involved and it is going to take forever – but that's the whole point!²

References

In order of citation in the paper:

- 1. Miguel A. Santos, *Managing Planet Earth: Perspectives* on Population, Ecology and the Law, (1990), pg 123 142.
- Michael Braungart & William McDonough, Cradle to Cradle: Remaking the Way We Make Things, (2008) pg 45–67, 103–115, 186.
- 3. Optimum Population Trust, http://www. optimumpopulation.org/opt.more.climate.html, accessed 1 Dec 2009.
- 4. Thomas Robert Malthus, *First Essay on Population: 1798*, (reprint 1966), Chapter 1.
- 5. Wikipedia, http://en.wikipedia.org/wiki/World_ population; World Geography, http://geography.about. com/od/obtainpopulationdata/a/worldpopulation.htm, accessed 1 Dec 2009.
- Paul R. & Anne H. Ehrlich, *The Population Explosion*, (1990), pg 205–225.

- George Monbiot, http://www.monbiot.com/ archives/2009/09/29/the-population-myth/, accessed 1 Dec 2009.
- United Nations, http://unstats.un.org/unsd/ environment/air_co2_emissions.htm, accessed 1 Dec 2009.
- 9. E. Fritz Schumacher, *Small Is Beautiful: A Study of Economics as if People Mattered*, (1973), pg 233–233, 275.
- Cyrille de Klemm et al, Conserving Biological Diversity: The Legal and Institutional Issues, in Asian Development Bank & World Conservation Union, Biodiversity Conservation in the Asia and Pacific Region: Constraints and Opportunities; Proceedings of a Regional Conference 6-8 June 1994, Philippines, (1994), pg 402–468.
- 11. James Gustave Speth & Peter M. Haas, *Global Environmental Governance*, (2006), pg 125–150.
- 12. John S. Dryzek, 2nd Ed, *The Politics of the Earth: Environmental Discourses*, (2005), pg 74–75.
- 13. Dennis & Donella Meadows & Jorgen Randers, *Limits* to Growth: The 30 Year Update, (2004), pg 257–258.
- 14. Eco Media, http://ecomedia.org.au/press/2009/06/15/ solar-rebate-plan-too-successful/, accessed 1 Dec 2009.
- 15. Eco Media, http://ecomedia.org.au/press/2009/06/15/ solar-rebate-plan-too-successful/, accessed 1 Dec 2009.
- 16. Australian Bureau of Statistics, http://www.abs.gov.au/ ausstats/abs@.nsf/mf/3236.0, accessed 1 Dec 2009.
- Philip Harrington, Government Support for the Renewable Energy Industry in Australia, in Renewable Energy: Technology & Policy for Sustainable Development, Proceeding of the World Renewable Energy Congress, Perth, Australia, February 1999, (1999), pg 283–291.
- Parvez Hassan, The Political and Legal Dynamics of the Implementation of the Convention on Biological Diversity in the Asian and Pacific Region, in Asian Development Bank & World Conservation Union, Biodiversity Conservation in the Asia and Pacific Region: Constraints and Opportunities; Proceedings of a Regional Conference 6–8 June 1994, Philippines, (1994), pg 391–401.
- 19. John E. Cohen, *How Many People Can the Earth Support*, (1995), pg 371–372.

AUSTRALIAN GOVERNMENT ASSISTS PAKISTAN FLOODS Global Citizenship

Dr Susan Bliss



Photograph: Pakistani children Source: www.multyshades.com/wp-content/uploads/2010/08/2012.jpg

At regular, but unpredictable intervals, people around the world are affected by natural hazards. These may be caused by climatic events such as a flood. Hazards become disasters when people's homes and livelihoods are destroyed.

The second Wednesday in October is International Day for Natural Disaster Reduction which focuses on the urgent need for prevention activities to reduce loss of life: damage to property, and infrastructure; adverse impacts on the environment; and the social and economic disruption caused by natural disasters.

Scale of the disaster

In late July monsoon rains struck Pakistan causing devastating floods in the north and south of the country. The United Nations said the floods affected an area the size of England. The main provinces affected were the Punjab, Sindh, Khyber Pakhtunkhwa and the northern areas of the country.

The floods:

- affected more than 20 million people;
- injured 3,000 people;
- damaged 2 million homes;
- destroyed 3.6 million acres of crops;
- caused the loss of 1.2 million large livestock and 6 million poultry; and
- inundated about one-fifth of the country.

Experts described it is the worst flood in 80 years and warned the death toll could rise still further, as many towns and villages are not accessible, and communications have been disrupted. In some areas, the water level was 5.5 metres high and residents were seen perched on rooftops.

As Pakistan does not have all the resources to meet the demands of a large-scale disaster Australia is supporting the United Nations and Pakistani Government's Initial Floods Emergency Response Plan (www.ausaid.gov.au/hottopics/topic.cfm?ID=1239_2890_4259_5765_9339)

Map of flooded areas in Pakistan



Source: http://en.wikipedia.org/wiki/File:Indus_flooding_2010_en.svg

Emergency response

When disaster strikes the first response is to save lives (humanitarian action). While each disaster creates unique circumstances and the response needs to be tailored to meet the specifics of the situation the following general areas will usually form part of the response:

- Search and rescue finding those who may be trapped under debris;
- Assessment of needs working out what is required, in what quantities, and for whom;

AUSTRALIAN GOVERNMENT ASSISTS PAKISTAN FLOODS

- Health providing medical care and preventing the spread of disease through immunisation, the provision of safe water and food, waste disposal and burial of the dead;
- Basic needs procuring and distributing food, shelter and clothing;
- Gender understanding the roles of men and women in families and communities to identify needs and ensure the fair distribution of resources;
- Livelihood and economy assisting people earn a living to speed their recovery;
- Emotional support counselling and reuniting separated families;
- Logistics transporting people and equipment;
- Finance obtaining, allocating and accounting for money;
- Communication providing affected people with information, fundraising;
- Infrastructure rebuilding roads, electricity and telephone networks, water pipelines, and waste disposal systems.

Source: www.globaleducation.edna. edu.au/globaled/go/cache/offonce/pid/ 308;jsessionid=8E7906D0E747018BBA0D724F9F1D62F5

Distribution of food relief



People struggle to get relief food distributed by volunteers at outside a camp for flood-affected people in Hyderabad, Pakistan.

Photograph: Pervez Masih/AP. Source: www.csmonitor. com/World/Asia-South-Central/2010/0818/Pakistan-floodsresidents-brace-for-a-second-wave-of-problems

Some of the issues considered in the disaster response include:

- respecting local knowledge while using international best practice;
- meeting survival needs in a culturally appropriate manner (e.g. types of food, clothing, shelter);
- limiting the effects of aid on the local economy;

- training people, organisations and communities to manage development fairly;
- prioritising the distribution of limited supplies; and
- gaining funding for long-term redevelopment and disaster preparedness, rather than simply responding to the current emergency situation.

In the chaos of a disaster the pressure is to make quick decisions and to balance the specific interests of victims, governments, Non-Government Organisations (NGOs) may result in 'best practice' not always being achieved.

Source: www.globaleducation.edna. edu.au/globaled/go/cache/offonce/pid/ 308;jsessionid=8E7906D0E747018BBA0D724F9F1D62F5)

Floodwaters recede but impacts ongoing

Although floodwaters have receded the situation in Pakistan remains dire, with more than 6 million dependent on emergency food supplies and more than 4 million homeless. Also pools of stagnant water led to 3.5 million children at risk from deadly water-borne diseases such as diarrhoea. Other major health problems include acute respiratory infections as well skin diseases such as scabies. About 72,000 children are affected by severe malnutrition, according to United Nations officials.



Pakistani flood survivors use a camel cart to reach areas in Taunsa near Dera Ghazi Khan

Source: www.csmonitor.com/World/Asia-South-Central/2010/0824/Pakistan-floods-raise-questions-on-thefuture-of-politics-in-Pakistan

Medical Task Force treats more than 200 patients a day

Pakistan has appealed to international donors for help in responding to the disaster. The most urgent immediate needs were shelter, plastic sheeting, halal food, mosquito nets and repellent, water pumps and purification tablets, generators, prevention of skin diseases, and disposal of dead animals.

Two C-17 Globemaster flights from Australia delivered tents, tarpaulins, generators, water storage containers and water purification tablets. The supplies provided shelter

AUSTRALIAN GOVERNMENT ASSISTS PAKISTAN FLOODS

and 30 days of safe drinking water for 10,000 families. Australia also provided 2,000 birthing kits to support expectant mothers.

A joint operation between AusAID and the Australian Defence Force contributed to the efforts of the Pakistan Government and the international community to help address growing health concerns in Pakistan.

In response hundreds of flood-affected Pakistanis have been provided with primary health care treatment since the opening of the Australian health centre at Kot Addu in Punjab on 2 September 2010. The health centre, which is staffed by Australian civilian and defence doctors, nurses and paramedics, sees more than 200 patients a day. Patients have been treated for diarrhoea, skin conditions, malaria, and other illnesses and injuries.

Up to 180 Australians were deployed as part of the taskforce which is prepared to operate for an extended period in Pakistan. It will maintain close links with the Pakistan Government to ensure it provides support for as long as required.

This deployment builds on the \$35 million worth of humanitarian assistance Australia has already provided.

Source: www.ausaid.gov.au/hottopics/topic.cfm?ID=1239_ 2890_4259_5765_9339



Australian Medical Task Force member, Dr Tim Gray, conducts preliminary assessments of Pakistani patients outside of the Kot Addu Health Centre prior to admission.

Photograph: Department of Defence. Source: www.ausaid.gov. au/hottopics/topic.cfm?ID=1239_2890_4259_5765_9339

Australian funding - global citizenship

Australian funding helped to provide:

- a temporary medical facility in the town of Kot Addu to provide primary medical assistance, midwifery and other heath services;
- food to eight million people by the end of September through the World Food Programme;

- clean water and sanitation to two million people through UNICEF to halt the spread of diseases;
- emergency shelter and blankets for 300,000 families who lost their homes through the United Nations High Commissioner for Refugees;
- emergency shelter and supplies to more than 175,000 people through the International Federation of the Red Cross and Red Crescent Societies;
- food, shelter, and other emergency relief to help at least 250,000 people through Australian nongovernment organisations (NGOs); and
- support to the United Nations Office for the Coordination of Humanitarian Affairs to coordinate and support the Pakistan Government's response to the crisis.

In addition, 18 Australian humanitarian experts were sent to Pakistan to join the relief effort. They supported UN agencies in relief efforts and coordination through Red R Australia, the Australian Red Cross and non-government organisations such as World Vision. Depending on need and access across flood-affected areas, World Vision provided cash-for-work activities to 1,000 people, opened seven health posts, set up 20 child-friendly spaces and 20 women-friendly spaces to provide a safe environment for children and women.

Economic effects

The International Monetary Fund says the floods which devastated Pakistan will present a massive economic challenge to its government and people.

On 7 September 2010, the International Labour Organisation (ILO) reported that more than 5.3 million jobs had been lost due to the floods, emphasising that "productive and labour intensive job creation programmes are urgently needed to lift millions of people out of poverty that has been aggravated by flood damage".

The GDP growth rate of 4% prior to the floods may turn negative with the estimates ranging from -2% to -5% of GDP. The loss of crops will hit the textile manufacturing industry which is the largest export sector of Pakistan. Furthermore, the loss of over 10 million heads of livestock along with the loss of other crops will bring down total agricultural production by more than 15%.

Source: http://en.wikipedia.org/wiki/2010_Pakistan_floods

Taliban insurgency

The flood diverted Pakistani military forces from fighting the Pakistani Taliban insurgents (TTP) in the Northwest because they were needed to help in the relief effort. It is feared this will allow Taliban fighters to regroup. On the other hand, some suggest that by helping flood victims, the US has an opportunity to improve its image.

Source: http://en.wikipedia.org/wiki/2010_Pakistan_floods
AUSTRALIAN GOVERNMENT ASSISTS PAKISTAN FLOODS



Pakistani villagers flee their homes due to flooding in Thatta, Pakistan. The Taliban hinted they may launch attacks against foreigners helping Pakistan respond to the worst floods in the country's history, saying their presence was unacceptable.

Photograph: Fareed Khan/AP. Source: www.csmonitor. com/World/Asia-South-Central/2010/0827/Pakistan-floods-Pakistani-Taliban-threats-don-t-deter-foreign-aid-workers

Australian aid to Pakistan

Pakistan is an important bilateral partner for Australia. Our aid program in Pakistan has doubled since 2008. In 2010-11, Australia will provide \$66.5 million in total Official Development Assistance. The AusAID program is being reviewed to assess how it can support recovery and reconstruction efforts in the wake of the floods.

Australian aid activities in Pakistan. Source: www.ausaid.gov. au/country/cbrief.cfm?DCon=6976_3391_7100_736_9776&Co untryID=11&Region=SouthAsia

Activities

Read about the response to the Pakistan floods using news and web reports and answer the key geographical questions:

- What happened?
- How many people were affected?
- How was property affected?
- How was the environment affected?
- Who responded and how?
- What obstacles to the response might have been encountered?
- What lessons might have been learned that could make the response to future disasters more effective?

Develop a dramatisation based on your research of interactions between people affected by the disaster and those involved in the response: survivors, search and rescue, medical personnel, distribution of food, shelter and clothing, government official, media personnel etc.

ICT

- When disaster strikes: this teaching activity helps students begin to understand the causes and effects of natural disasters on people and the environment.
 www.globaleducation.edna.edu.au/globaled/go/ pid/4181
- Fact sheet on 2010 floods in Pakistan. [PDF 109kb] – www.ausaid.gov.au/hottopics/pdf/pakistan-factsheet.pdf
- Download audio files, video and footage of the Medical Task Force in Pakistan and Australia's relief effort

 www.defence.gov.au/op/pakistan/index.htm
- National Disaster Management Authority, Pakistan
 http://ndma.gov.pk/index.html
- General information on Pakistan www.ausaid.gov. au/country/country.cfm?CountryID=11&Region=S outhAsia
- UN report on donations http://fts.unocha.org/ reports/daily/ocha_R24_E15913___1009160204.pdf
- Civilian medical personnel deployed to Pakistan (31 August 2010)– www.foreignminister.gov.au/ releases/2010/fa-s100831.html
- One thousand Pakistani patients treated by Australian Medical Task Force. (8 September 2010) – www.ausaid.gov.au/media/release. cfm?BC=Media&ID=2920_3111_1741_2089_1754
- Pakistan floods http://en.wikipedia.org/wiki/2010_ Pakistan_floods
- Photographs. www.multyshades.com/2010/08/ pakistans-flood-victims-in-pictures/
- Caritas www.caritas.org.au/ozspirit/index.html
- Global Education. www.ausaid.gov.au/hottopics/ topic.cfm?ID=1239_2890_4259_5765_9339



Flood survivors negotiate a flooded road at Muzaffargarh, in central Pakistan.

Source: www.csmonitor.com/World/Global-News/2010/0819/ Pakistan-floods

2010 International Year of Biodiversity ELEVER Director Clobal Education NEW

Dr Susan Bliss, Director Global Education NSW

'When I was very young, biology, the diversity of life, was one of my main interests. I know there's this image people have that I'm this spoiled, cocky punk of an actor. Honestly, that's not who I am. I really care that so many species have been wiped out, like genocide of entire races. I believe in the divine right of all species to survive on this planet. So I decided I want to be active as an environmentalist. I learned. I asked experts. I got active'.

Leonardo DiCaprio

Scientists know we must protect species because they are working parts of our life-support system' Paul Ehrlich

'Biodiversity is the greatest treasure we have... Its diminishment is to be prevented at all cost' Thomas Eisner

'Almost a quarter of the world's mammals face a high risk of extinction within thirty years'

World Wildlife Fund

Introduction

The National Strategy for the Conservation of Australia's Biological Diversity defines biological diversity, or 'biodiversity' as the variety of life forms on earth. This includes different plants, animals and microorganisms, the genes they contain and their adaption to different land and water ecosystems. The year 2010 has been named the United Nations International Year of Biodiversity to celebrate the variety of life on earth as biodiversity is essential to sustain life on earth, address poverty and preserve cultural diversity and identity. The Millennium Development Goals (2000–2015) reinforce the commitment of the global community for an integrated approach to sustainable development.

Geofacts

- humans use at least 40,000 species of plants and animals a day
- about 1.4 million species have been described (identified and classified) but less than 10% catalogued
- up to 90 million unknown species
- about 130 species become extinct each day 1,000 times higher than the natural extinction rate
- approximately 21% of mammals and 70% of plants are threatened with extinction
- clearing forests is the main cause of declining species
- climate change is seen as a threat to endangered species
- half the world's wetlands have been cleared

Australia supports 10% of the Earth's biological diversity which makes a significant contribution to our economy (e.g. exports, employment) our identity and our culture (e.g. koala, kangaroo, eucalypt, surf, bush). The Australian Government recognises the importance of biodiversity conservation and implemented Australian Biodiversity Conservation Strategy (2010–2020).

Each person on Earth has a role to play in ensuring the future health and well-being of all people, animals, plants and ecosystems on the planet. We have a shared responsibility to use sustainable energy sources, protect habitats and support a more sustainable future.

- coral Reefs may disappear by 2050 from the anticipated impacts of climate change
- only 12% of the planet is under some form of protection
- some species such as the grizzly bear and the green sea turtle have been brought back from the brink of extinction.
- over time people have relied on more than 10,000 species for food but only 12 species provide 80% of all our food
- tourism, the largest industry in the world, depends on biodiversity
- biodiversity has spiritual and cultural significance to global communities e.g. Indigenous people
- humans eat 7,000 plant species but there are only 20 in a Big Mac



A. Biodiversity

Biodiversity refers to the variety of life on Earth that has evolved over 3.5 billion years, shaped by natural forces (evolution, migration, extinction, ice ages, fire and movements in the earth's crust) and increasing human interactions. From the dawn of agriculture, about 10,000 years ago, through the Industrial Revolution of the past three centuries, humans have reshaped the Earth's landscape. Unfortunately the rate and extent at which humans are altering the environment pose threats to sustainable development and the quality of life of humans.

B. Web of life _____

Biodiversity forms the 'web of life' of which we are an integral part, and upon which we depend. It is divided into three categories:

- **genetic diversity:** refers to the differences in genetic make-up between distinct species and variations within species (different chromosomes, genes, and DNA, the building blocks of life that determine the uniqueness of each individual and each species).
- species diversity: refers to the variety of living organisms on Earth estimated between 5 and 50 million, though only 1.4 million have been described (World Resource Institute)



• ecosystem diversity: refers to the diversity of ecosystems and the species within each ecosystem. It includes the variety of habitats from cold snowfields to hot rainforests and from high mountains to deep ocean floors. Even in the busiest city park and the quietest rocky sea cave there are millions of diverse species. In each ecosystem, living plants and animals, including humans, form a community, interacting with one another as well as the air, water and soil.

Diversity is not evenly distributed across species, regions, or the planet. Seventy percent of the world's species occur in only 12 countries: Australia, Brazil, China, Columbia, Ecuador, India, Indonesia, Madagascar, Mexico, Peru, and Zaire.

Group	Number of Described Species	Group	Number of Described Species
Bacteria and blue-green algae	4,760	Crustaceans	38,000
Fungi	46,983	Insects	751,000
Algae	26,900	Other Arthropods and minor invertebrates	132,461
Bryophytes (mosses and liverworts)	17,000	Molluscs	50,000
Gymnosperms (conifers)	750	Starfish	6,100
Angiosperms (flowering plants)	250,000	Fishes	19,056
Protozoans	30,800	Amphibians	4,184
Sponges	5,000	Reptiles	6,300
Corals and Jellyfish	9,000	Birds	9,198
Roundworms and earthworms	24,000	Mammals	4,170
Total			1 435 662

Table: Number of describe species

Source: www.globalchange.umich.edu/globalchange2/current/lectures/biodiversity/biodiversity.html

Pie graph: Number of currently known species



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Source: http://media-2.web.britannica.com/eb-media/35/6535-050-04917919.jpg

C. Case study: penguin species

Photograph: Rockhopper penguins living on Gough Island decreased by 90% since the 1950's

Photographs: Ecosystem diversity. What species live in these ecosystems?



Tibet: Often called 'the roof of the world,' comprising high tablelands averaging over 4,950masl with peaks at 6,000m to 7,500m, including Mount Everest. Source: J & S Bliss



India: Thar desertsalinity. Source: J & S Bliss



Penguins are usually found in the Southern Hemisphere near nutrient-rich, cold-water currents that provide an abundant food supply. The Emperor penguin fasts for months through harsh winters sustained by stored energy from a long-ago feed from the sea. Despite adaptation to the environment this bird faces pressure from overfishing, changing weather patterns and global warming. The Emperor is not alone as more than half of the world's 19 penguin species are in danger of extinction. Penguins depend on krill, the keystone of the Antarctic marine food

chain. Since the 1970s krill has declined by 80%. The penguins' survival relies on a delicate balance, to which a single disruption could become catastrophic.



Diagram: Life cycle of the Emperor Penguin



Source: http://www.embracinghome.com/wp-content/uploads/2008/11/800px-penguin_ lifecycle_h.jpg

Local Response: Manly Council

Threatened populations of Little Penguins (*Eudyptula minor*) are present in the Manly local government area. During 2008/09 Manly Council continued its active involvement in the Little Penguin Recovery Program in association with the Department of Environment, Climate Change and Water (DECCW). Gated barriers were constructed at Manly Wharf to assist in protecting the Little Penguins nesting at the Wharf.



Source: www.pittwater.nsw.gov.au/__data/assets/pdf_ file/0003/53697/SHOROC_Regional_SoE_200809.pdf

D. Limited knowledge base

There is still an incomplete understanding of the1.4 million species 'known to science' such as their: reproductive biology; demography; chemicals they contain; ecological requirements; and the roles they play in ecosystems. Also genetic diversity within species is only well known for a small number of species, such as those directly involved in human health, scientific research and economic exploitation.

The estimates of 5 to 50 million species on Earth are based on expert opinion of how many species are yet to be formally identified. When you consider every species has its own parasite and many groups such as nematodes and bacteria, have yet to be thoroughly studied, these estimates may be a reality.

Case study seamounts

Seamounts are underwater mountains rising from the ocean floor known to be hotspots of biological diversity and important for marine food webs. Migratory fish and cetaceans rely on seamounts for their food supply. At present there is limited knowledge of seamount-associated fauna



Source: http://rovicky.files.wordpress.com/2009/05/map_seamounts1.jpg

Map: Seamounts

E. Declining biodiversity

More than 90% of all organisms that lived on Earth are extinct. As new species evolve to fit changing ecological niches, older species fade away. At least a handful of times in the last 500 million years, 50% to more than 90% of all species on Earth have disappeared in a geological blink of the eye.

Our cultural identity is deeply rooted in our biological environment. Plants and animals are symbols of our world, preserved in flags, sculptures, and other images that define us and our societies. We draw inspiration from looking at nature's beauty and power. While loss of species has always occurred as a natural phenomenon, the pace of extinction has accelerated as a result of human activity. Ecosystems are fragmented or eliminated and many species are extinct. These extinctions are irreversible and, given our dependence on food crops, medicines and other biological resources, pose a threat to our future well-being.

Column graph: Threatened animal species - global overview



Source: www.priweb.org/globalchange/images/bioloss/threatenedanimals.jpg





F. Threats to Biodiversity _

Between 1970 and 2000, there was a 40% decline in biological diversity. The loss of species and ecosystems is mainly attributed to the accelerating transformation of the Earth by the growing human population with their large ecological footprint (EF):

- human population: passed 6.8 billion in 2010 and is expected to reach 9 billion by 2050
- human ecological footprint (EF): everyone has an ecological footprint (EF) that measures their dependence on natural resources. It includes the total area of productive sea and land used to grow food, supply energy, build roads and buildings, grow forests for wood and paper, and dispose of waste. The EF is estimated at 1.4 planet Earths. This means humanity uses ecological resources 1.4 times as fast as Earth can renew them. Australia has one of the highest ecological

G. Main causes of declining biodiversity

 habitat loss and fragmentation is considered the primary cause of biodiversity loss. As all species have specific food and habitat needs, the clearance of native vegetation for agriculture, housing, timber and industry, destroys these habitats and their organisms.

Tropical forests are important because they harbor at least 50%, of world's biodiversity and the current rate of loss is estimated at 2% per annum. Also species that require a large home range, such as the grizzly bear, will not survive if the area is too small.



Bar graph: Percentage of original rainforest 1980–2010

• invasion of exotic plants and feral animals have caused changes in ecosystem functioning and the extinction of native species. Australia's native plants and animals adapted to life on an isolated continent over millions of years. Since European settlement they compete with introduced animals such as cane toads, goats, foxes, deer, rabbits, pigs, cats, dogs and horses for habitat, food and shelter. Introduced sheep and cattle have caused extensive damage to native vegetation and soils through grazing and trampling. footprints on earth. If the rest of the world consumed at the rate which Australian's consume natural resources and produce waste, it would require another three planets to support our lifestyle

Pie graph: Composition of Australia's ecological footprint



Source: http: www.oneatatimefoundation.org.au/online-newsletter/092008/ nl092008_files/visual_editor_preview_002.htm

Free cartoon: Animals from the jungle trying to catch up with the truck with the last trees



Source: http://strategy2c.files.wordpress.com/2009/11/ animals-running-after-trees.jpg

Conventional methods of control include fencing, trapping, baiting and shooting as well as biological control. Biosecurity protects the environment from the negative effects associated with invasive species including weeds, pests and diseases. It also includes border protection and post-border management and control

Photograph: German rabbit

February 2007 Washington Post: the colossal bunny is a German gray giant named 'Robert' who weighed 10.4kg. Karl Szmolinsky, a long-time rabbit breeder lives in Eberswalde, Germany.



Source: www.hoax-slayer.com/giant-rabbit.shtml

Source: Geoactives 1 Bliss and Paine, Jacaranda 2009

News: Pittwater Council's Rabbit Control Programs

The feral rabbit population is increasing at an alarming rate throughout the Pittwater Local Government Area and is partly attributable to the accidental or deliberate release of pet rabbits. Rabbits are a problem because they:

- destroy native vegetation communities by eating seedlings, digging and increasing soil nutrients (from their droppings)
- increase erosion by grazing and digging
- eat the seedlings of native species, reducing native plant biodiversity
- compete with native animals for food and shelter

RabbitScan is a nation-wide challenge for the community. Residents help scientists map where rabbits are located



Source www.rabbitscan.net.au/joomla/

exploitation of natural resources by humans has caused destruction to ecosystems. Exploitation of biodiversity occurs for a variety of reasons: food (e.g. fish); construction (e.g. trees); industrial products (e.g. animal blubber, skins); pet trade (e.g. reptiles, orchids); fashion (e.g. fur, ivory); and traditional medicines (e.g. rhino horn). At \$40,000 to \$100,000 per rhino horn, there is little wonder that some rhino species are down to a few thousand, with only a slim hope of survival in the wild. The trade is driven by Asia's demand for horns and is made worse by sophisticated poachers, who use veterinary drugs, poisons, cross bows and high calibre weapons to kill rhinos. Since 2006, 95% of the poaching in Africa occurred in Zimbabwe and South Africa. The increase in poaching is also due to a decline in effective law enforcement. For example in Zimbabwe the conviction rate for rhino crimes is only three percent.

News

Four rare Northern White rhinos recently transferred to Kenya from a Czech zoo have been dehorned to protect them from poachers. 'With the increase of poaching in Kenya, we are simply not taking any chances'... 'Without a horn, these rhinos are of no value to poachers' Elodie Sampere, OI Pejeta Conservancy.

The rhinos, two males and two females, are among only eight members of a very rare sub-species of white rhinos known to be alive worldwide. They were transferred back to Kenya with the hope they would reproduce.

Kenyan wildlife rangers in January 2010 arrested 12 men involved in the illicit game trade syndicate suspected of killing a 10-year-old white rhino and hacking off its horns. The east African country, which has the world's third largest rhino population (around 600 black and 300 white rhinos) suffered its worst year for rhino poaching in 2009, when twelve black and six white rhinos were killed.

Source: adapted from Nairobi (AFP) 26 Jan, 2010

unsustainable use of natural resources resulted in pollution of air, land and water. Any chemical in the wrong place or at the wrong concentration can be considered a pollutant. Transport, industry, mining, agriculture and power generation contribute pollutants to air, land and water. Pollutants enter aquatic ecosystems (e.g. mercury, lead, pesticides and herbicides) and as a result can lower reproduction, prevent growth and cause death. The organisms directly affected by toxic pollutants are larvae, eggs, and organisms that live near the bottom of aquatic habitats where pollutants tend to settle. Filter feeders (e.g. krill, clams and mussels) are not directly affected by the presence of toxic chemicals in the water. Instead the toxins bioaccumulate up the food chain. For example, humans, animals, and birds have suffered mercury and lead poisoning, and other neurological diseases from eating fish and shellfish contaminated with accumulated toxins.

Pie graph: Hazardous Waste



Types of hazardous waste disposed of in the Chemical Cleanout Program Northern Sydney Region (Hornsby, Kuring-gai, Lane Cove, Manly, Mosman, North Sydney, Pittwater, Ryde, Warringah, Willoughby and Hunters Hill local government areas).

Source: www.warringah.nsw.gov.au/publications/documents/SHORO C6HumanSettlementSoE200809.pdf



- inappropriate fire regimes effects biodiversity. Bushfires hit newspaper headlines in southern Australian summers, emphasising death and destruction. The revival of plants and animals after a fire is influenced by their inherent characteristics and their **fire regime** (fire intensity, interval between fires, seasonality, and type of fire). Not all species respond the same way to a fire. Species may favour one fire regime but be threatened by another. Effective response requires a better understanding of the location of different biodiversity assets, the response of organisms to particular fire regimes, and different bushfire behaviour to fuel load, fuel distribution, topography and climate.
- changes to aquatic environment and water flows effects biodiversity. Humans have changed the flow of rivers (e.g. dams, reservoirs) and cleared wetlands for settlements.

H. Why conserve biodiversity?

'A diverse ecosystem will also be resilient, because it contains many species with overlapping ecological functions that can partially replace one another. When a particular species is destroyed by a severe disturbance so that a link in the network is broken, a diverse community will be able to survive and reorganize itself... In other words, the more complex the network is, the more complex its pattern of interconnections, the more resilient it will be'.

Fritjof Capra Founding Director of the Centre for Ecoliteracy

The diverse array of living organisms provides humans with resources for food, clothing, shelter, fuel and medicines. Indirectly biodiversity provides ecosystem services, such as maintenance of the composition of the atmosphere, protection of watersheds and coastal zones, maintenance of soil fertility, and the breakdown and recycling of wastes. In addition, values based on ethical, aesthetic, spiritual and cultural considerations underlie biodiversity's importance to humanity.

Reasons for conserving biodiversity include:

- fundamental part of Earth's life support system. Biodiversity supports basic natural services for humans, such as fresh water, fertile soil and clean air. Biodiversity helps pollinate flowers and crops, cleans waste and puts food on the table. Without biodiversity humans would be unable to survive.
- no organism lives in isolation. Millions of organisms on Earth interact with each other contributing to the survival of the planet. Biodiversity plays a role in regulating natural processes such as the mating seasons of animals, pollination of plants, and food webs

These changes had a major impact on biodiversity. Also the drift of the Australian population to the coast adversely impacted on coastal biodiversity. The Bilgola Beach Preservation Society clears exotic plant species and replants native species. Their work has seen the reappearance of native bird species.

• climate change threatens species and ecosystems. The distribution of species (biogeography) is largely determined by climate. Climate change may shift this distribution. As a result plants and animals may be unable to adapt as the pace of climate change could be too rapid. For example the climate of present day Yellowstone Park in US is expected to shift several hundred kilometres northward but the Park will remain at its present fixed location. As a result some species and ecosystems are likely to be eliminated.

Diagram: Simplified food web – marine and terrestrial links, no organism lives in isolation



Source: http://lazearscience.blogspot.com/2007/11/energy-andecosystems-natural.html

• food and drink. Biodiversity provides food for humans. Today agriculture depends on a few crops. Only 150 species are cultivated on a significant global scale and 80% of our food comes from 20 plants. However, each species varies in height, colour, branching pattern, fruiting time, seed size, or flavour. They also vary in their response to cold, heat, or drought; nutritional qualities; or their ability to tolerate specific pests and diseases.

Photograph: Variation in pepper species



Source: www.cgn.wur.nl/NR/rdonlyres/189C1257-4D91-4C50-A6A8 3497BB7EC524/57313/variation_pepper1.jpg

With anticipated climate change agricultural production is likely to show biodiversity gains and losses, depending on crop and climate.

World	Africa	Western Europe
There are over	The main staple	The main staple
50 000 edible	foods in terms of	foods in terms of
plants. Rice,	energy – cereals	energy – animal
maize and wheat	(46%), roots and	products (33%),
provide 60% of	tubers (20%) and	cereals (26%) and
the world's food	animal products	roots and tubers
energy intake	(7%).	(4%).

What would happen if disease, global warming or insects wiped out a nation's crops? Would people starve? The Global Crop Diversity Trust in Rome aims to prevent this from happening. The Trust is saving 100,000 different varieties of food crops from 46 countries. By focusing on staple crops, such as rare varieties of barley, wheat, rice, banana/plantain, potato, cassava, chickpea, maize, lentil, bean, sorghum, millet, coconut, breadfruit, cowpea and yam, the Trust aims to preserve the world's crop biodiversity, and ultimately our food supply. The crops are stored at the Svalbard Global Seed Vault, aka the 'Doomsday Vault', at a mountainside facility in Norway.

Photograph: Svalbard Global Seed Vault



Source: www.boston.com/bostonglobe/ideas/brainiac/1doomsday-seed-vault-lg-1.jpg

Crop diversity is essential when the dominant crop is attacked by a disease. For example the Irish potato blight of 1846, was the result of planting only two potato varieties, both of which were vulnerable to disease. Monoculture, the lack of biodiversity, has been a contributing factor to several agricultural disasters, such as the European wine industry collapse in the late 1800s.

Case study: potatoes

Potatoes are the world's fourth largest food crop, following rice, wheat, and maize. There are about five thousand potato varieties worldwide. The humble potato moved onto the world's stage when the United Nations (UN) declared 2008 as the International Year of the Potato (IPY). The UN focused world attention on the role the potato can play in providing food security and eradicating poverty in support of achieving the Millennium Development Goals (2000 - 2015).



Photograph: Biodiversity and culture

There are around 7500 tomato varieties and the town of Buñol in Spain, celebrates La Tomatina, an annual festival centred on an enormous tomato fight.

abc.net.au/news/

new drugs.



s1450573.htm Medicines: A significant proportion of drugs are derived, directly or indirectly, from biological sources. However, only a small proportion of the total diversity of plants has been investigated for potential sources of

Biodiversity answer to cancer and AIDS

Humans depend on biodiversity for their health. More than 60% of the world's population relies on plant medicine for primary health care. Of the 119 chemical compounds derived from 90 plant species, 74% of these are used as drugs. Only a handful of plant species have been exhaustively studied for their potential value as a source of drugs. There are growing concerns plant species have the potential to stop AIDS and heart diseases, and will be lost to the world if biodiversity continues to decline at the present rate. Some of the plants at risk include:

- Himalayan yew tree's bark contains an anti-cancer drug;
- African cherry treats prostate problems;
- Magnolia fights cancer, dementia and heart disease;

- Hoodia suppresses appetite, and could be the next miracle weight loss drug; and
- Autumn crocus is used for gout and leukaemia.

Plantlife established China's first nature reserve for medicinal plants, run by the community.

Photograph: Oriental foxglove

The leaves of the oriental foxglove plant contain digitoxin, a drug used to treat heart disease. It is in a family of medications that show promise for fighting colon cancer.



- Industrial materials: A wide range of industrial materials are derived from biological resources. These include building materials, fibres, dyes, resins, gums, adhesives, rubber and oil. There is potential for research into sustainably utilising materials from a wider diversity of organisms.
- Ecological services: Biodiversity provides services we take for granted such as regulating the chemistry of our atmosphere and water supply. For example wetlands provide: food and shelter for birds, animals, insects and microorganisms; flood control for surrounding area; protects the shore line from wave action; and acts like a filter, cleaning water from run-off before reaching a lake or ocean

I. Extinction of species

Extinction is the gravest aspect of the biodiversity crisis – it is irreversible. While extinction is a natural process, human impacts have elevated the rate of extinction by at least a thousand, possibly several thousand, times the natural rate. Mass extinctions of this magnitude have only occurred five times in the history of our planet - the last brought the end of the dinosaur age. Many scientists fear by end of the next century, 25% of existing species will become extinct

Article: Dodos gone forever

The seeds of the Calvaria tree, now found exclusively on the island of Mauritius, must pass through the abrasive gut of a large animal in order to germinate. None of the animals currently on Mauritius have this ability.

The dodo (a 25 kg pigeon) was hunted to extinction in the late 17th century. Some

of these seeds were excreted by dodos which germinated and grew. Today, no seeds germinate, and only a few very old trees exist. • Leisure, cultural and aesthetic value: Many people derive value from biodiversity through leisure activities such as walking in the countryside, bird watching or natural history programmes on television. Biodiversity has inspired musicians, painters, sculptors and writers. Over the millennia, Indigenous people have established distinct systems of knowledge, innovation and practices relating to the use and management of biological diversity on their land. Timely action is important to ensure traditional knowledge is not lost.

Photograph: Biodiversity study



New South Wales geographers on a walking tour organised by Greg Pashley, study changing biodiversity in the Osttirol (eastern Tyrolean Alps). Slope 45 degrees. Source: J. Bliss

• Future options: By signing the International Convention on Biological Diversity in 1992, countries signalled a commitment to 'conserve and sustainably use biological diversity for the benefit of present and future generations'.

Pie graph: Known causes of animal extinctions since 1600



Source: www.globalchange. umich.edu/globalchange2/ current/lectures/biodiversity/ biodiversity.html

Cartoon literacy: Dodo and human interaction



Unbeknownst to most ornothologists, the dodo was actually a very advanced species., living alone quite peacefully until, in the 17th century, it was annihilated by men, rats and dogs. As usual.

Source: http:// climateprogress. org/wp-content/ uploads/2007/10/ dodo-big.jpg

J. Biodiversity hotspots: richest and most threatened

Map: Hotspots



Source: www.biodiversityhotspots.org/xp/hotspots/Documents/cihotspotmap.pdf

The 34 hotspots identified by Conservation International cover 2.3% of the Earth's land surface, yet more than 50% of the world's plant species and 42% of all terrestrial vertebrate species are endemic to these areas. All are threatened by human activities.

Biodiversity hotspots are regions where large concentrations of life forms live, but today face extreme habitat loss. The Tropical Andes is the planet's most biodiverse hotspot. The rainforests of western Colombia and Ecuador have the highest amphibian biodiversity, while the Caribbean rainforests abound in endemic reptiles. Mesoamerica, the land bridge between North and South America, is biodiverse because the region has both lowland rainforest and high-altitude cloud forest.

K. List of Threatened Species

'Tigers, Polar Bears and Blue Fin Tuna are among the Most Threatened Species in 2010'

The International Union for the Conservation of Nature and Natural Resources (IUCN) is the world's main authority on the conservation status of species. The 2008

IUCN Red List of Threatened Species confirmed an extinction crisis, with almost one in four mammals at risk of disappearing forever. The study shows at least 1,141 of the 5,487 mammals on Earth are known to be threatened with extinction, and 836 are listed as Data Deficient.



Table: 2008 IUNC Red List 10 top countries

World Wildlife Fund

Threatened species	Amphibians Fishes								
2008 IUCN Red List	R	eptil	es	T		lollu	ics		
Top 10 countries	Birds			Other i			inverte	nvertebrates	
Table 5 Ma	mmals		Т			1	Т		
Country	M	В	R	Α	F	Мо	Oi	Plants	Total
Ecuador	43	69	11	171	15	48	12	1,839	2,208
United States	37	74	32	56	164	273	312	244	1,192
Malaysia	70	42	21	47	49	19	207	686	1,141
Indonesia	183	115	27	33	111	3	229	386	1,087
Mexico	100	54	95	211	114	5	57	261	897
China	74	85	30	90	70	1	20	446	816
Australia	57	49	38	48	84	175	282	55	788
Brazil	82	122	22	30	64	21	15	382	738
India	96	76	25	65	40	2	109	246	659
Colombia	52	86	15	214	31	0	31	223	652

Source: IUCN Red List, 2008 http://earthtrends.wri.org/updates/node/305

L. Case study: Orangutan



Photograph: With arms reaching two metres from fingertip to fingertip, orangutans are aptly suited for a life in the trees of Southeast Asia. Sophia Orangutan and infant at Brookfield Zoo. Source: www.apetag.org/conservation.html

About a million years ago, orangutans lived throughout most of Asia. Today they are only found in rainforests on the islands of Borneo and Sumatra. Their arboreal treeswinging journeys helps to spread tree seeds and some trees only germinate when they have passed through their gut. The orangutan is pivotal in creating the environment for thousands of fauna and flora which make up the biodiversity of the South East Asian rainforest. There are only two surviving species, both of which are endangered: the Bornean Orangutan (*Pongo pygmaeus*) and the critically endangered Sumatra Orangutan (*Pongo abelii*). Recent human interactions such as logging, mining, forest fires, pet trade, fragmentation by roads as well as infectious diseases has resulted in the decline of orangutans in Indonesia e.g. Sebangau National Park had 12,000 species in 1995 which fell to 6,000 in 2004, and Kutai National Park was 4,000 in 1970 and fell to 500 in 2009. Kalimantan lost over 39% of its orangutans is under threat from loss of habitat.

There was a decline in species during the Burning Season (1997-1998) (GTA workshops 2010). Also the cultivation of oil palm, the world's most productive oil seed, has expanded in Indonesia from 600,000 hectares in 1985 to 10 million hectares in 2010, decreasing the orangutans' habitat. Unilever and the World Wildlife Fund (WWF) founded the Roundtable on Sustainable Palm Oil (RSPO)



in 2003, to encourage producers of palm oil, used in biscuits and margarine, to minimise forest destruction, greenhouse gas emissions and loss of endangered wildlife, such as tigers and orangutans. Palm oil is



contained in hundreds of branded foods such as Kit Kat and household products such as Dove soap. Firms converting to RSPO include Unilever (2012), Cadbury (2014), and Mars and Nestlé (2015)

If current trends continue, the United Nations Environment Program (UNEP) fears the orangutans will be eliminated in the wild within twenty years. To conserve orangutans, conservation centres have been developed in Indonesia (e.g. Tanjung Puting and Sebangau National Parks) and in Malaysia (e.g. Semenggoh Wildlife Centre in Sarawak). Map: Range of orangutans past and present



Source: www.apetag.org/Images/Range%20Maps/RangeMapOrang.



Photograph source: www.worldwildlife.org/species/finder/tigers/year-of-tiger.html

M. Case study: Tigers _

On February 14, 2010, Chinese people celebrated the Year of the Tiger. Unfortunately there used to be nine tiger subspecies, but three have become extinct in the last century (Bali, Caspian and Javan tigers), leaving six today (see table). With an estimated 5,000 tigers, the U.S. captive tiger population exceeds the 3,200 tigers believed to exist in the wild today.

The different tiger subspecies live in a variety of habitats or ecosystems such as: forests in southern Asia; woodlands in Siberia; mangrove swamps; tall grasslands; and mountains where it snows. Tigers are facing extinction. Major threats are tiger body parts for medicine, fur and meat as well as loss of habitat.

Due to multiple threats, tiger conservation has three goals: ban illegal trade; end poaching; and preserve habitats. CITES prohibits the trade in tiger parts and derivatives, and aims to strengthen wildlife crime enforcement.

The world's largest wildlife trade monitoring network, TRAFFIC works to ensure trade does not threaten the survival of wild species or their role in natural ecosystems. To confront wildlife crime syndicates, the Association of South East Asian Nations, with the support from TRAFFIC and WildAid, launched the ASEAN Wildlife Enforcement Network (ASEAN-WEN).

The Tiger was chosen as the national animal of India due to its grace, strength, agility and power. In 2010 India will

Map: Tigers past and present range



Source: www.tuffydog.com/maps.html

host the World Tiger Summit where global experts will deliberate on the conservation of the diminishing striped cats in the wild.

Table: endangered tigers

Subspecies	Country	Ecosystem	Numbers in wild
Siberian (Amur)	Mainly in Russia but also northeast China and northern North Korea.	Thick forests covered with snow in winter	Less than 500
Bengal	India, Nepal, Bangladesh, Bhutan and Myanmar	From cold Himalayan forests to hot swamps to wet forests of north India to dry forests of Rajasthan	Less than 4,500
Indochinese	Mainly in Thailand, but also Burma, Cambodia, Laos, southern China, Vietnam, parts of Malaysia	Forests in hilly to mountainous areas	Less than 2,000
Malayan	Malaysian part of the Malay peninsula.	Hilly forest areas because lowland forests have been cleared for rubber and palm oil plantations.	Less than 500. Critically endangered
South China	Central – eastern China	Moist forests	Less than 50. Most critically endangered tiger, and possibly already extinct
Sumatran	Sumatra	Forests – lowland to mountain areas	Less than 500. Critically endangered

Photograph: Citizenship



Children are dressed in their 'Tiger Cub' (an environmental education club) uniforms and tiger masks. They are prepared to inform others that tigers in the wild need our help. What could you do?

> Source: WWF Canon / Adam Oswell www. worldwildlife.org/species/finder/tigers/photogalleries.html#support



Photograph source: www.worldwildlife.org/species/finder/giantpanda/panda.html

N. Case study: Giant Panda

The giant panda (*Ailuropoda melanoleuca*) which numbers less than 2500 in the wild is categorised as endangered on the IUCN's (International Union for Conservation of Nature) Red List of Threatened Species. As China's economy rapidly develops, this bamboo-eating member of the bear family faces a number of threats such as:

- habitat loss forests converted to agriculture and largescale development activities such as road construction, hydropower development and mining.
- habitat fragmentation by roads and railroads many panda populations are isolated in narrow belts of bamboo no more than 1.2km wide.
- bamboo harvesting.
- poaching.

'The Yangtze River basin is projected to undergo global warming and more extreme weather events'... 'These changes are expected to result in an increase in forest pests and diseases which may impact the production of some forest species' (Yangtze Conservation and Development Report 2009). If these changes result in decreased bamboo production there will be less food for the giant panda. Current WWF work focuses on the Minshan Mountains in Sichuan and Gansu provinces, and the Qinling Mountains in Shaanxi province. Their work includes:

- increasing the area of habitat under legal protection
- creating green corridors to link isolated pandas
- patrolling poaching and illegal logging
- building local capacities for nature reserve management
- continuing research and monitoring

Map: Changing Giant Panda habitat



Source: www.zooatlanta.com/images/panda_map.gif

O. Case study: Endangered Whales

Whale is the common name for any large fishlike marine mammal of the order Cetacea which have forelimbs modified as fins, a tail with horizontal flukes and nasal openings on top of the head.

For centuries, whales have been hunted for meat and as a source of raw materials. By the middle of the 20th century, industrial whaling left many species seriously endangered, and whaling ended in most countries. Several organisations (e.g. Greenpeace) aim to eliminate the hunting of whales and other threats to their survival.

Source: www.seaworld.org/animal-info/animal-bytes/animalia/ eumetazoa/coelomates/deuterostomes/chordata/craniata/mammalia/ cetacea/endangered-whales-fs.htm

Table: whale species population and status

Species	Population	Status and Listings*	
Northern right whale	500–1,000	endangered (ESA, IUCN)	
Southern right whale	3,000	endangered (ESA); vulunerable (IUCN)	
Bowhead whale	8,000	endangered (ESA, IUCN)	
Blue whale	10,000– 14,000	endangered (ESA, IUCN)	
Fin whale	120,000– 150,000	endangered (ESA); vulnerable (IUCN)	
Sei whale	50,000	endangered (ESA)	
Humpback whale	10,000+	endangered (ESA, IUCN)	
Sperm whale	200,000	endangered (ESA)	
ESA – listing according to Endangered Species Act.			
IUCN – listing accor	IUCN – listing according to IUCN/World Conservation Union Red Databook.		

Diagram: endangered Blue Whale



Source: http://news.bbc.co.uk/nol/shared/spl/hi/guides/456900/456973/ img/1180603645.gif

News item: Rare whale makes waves in Far North



wit: An endangered Sei whole comes in to take closer look at tourists at Adincourt Reel near Port Douzia

Blue whales are the largest mammals. Blues were hunted to the brink of extinction during the 20th Century, before being protected in the mid-1960s. In the Southern Hemisphere about 2,300 exist, increasing at 7% per year.

New England Whaler



Photograph source: http://commons.wikimedia.org./wiki/ File: Walfgang_zwischen_1856_und_1907.jpg

Rare whale makes waves in Far North

A DARK whole has Douglas dive boat by cruis in close and indulging in a watching.

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c were tre

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napped pictures of th uest while tourists if the side deck, ei whale is one of th a of the of burnts of to 55k d can grow to 20m and 30

Their distinguishing store is a single ridg tending from twin bi the tip of the upper i

e last leaving the Fa

Source: Cairns Post 2008, www. tropicalaustralia.com.au/ data/ assets/image/0017/281060/ Endangered Whale finds Sanctuary in Tropical North.jpg

P. Poverty and biodiversity

Poverty and biodiversity are linked. The poor, especially in rural areas, depend on biodiversity for food, fuel, shelter, medicines and livelihoods. Unfortunately exploitation of natural resources such as forests, land, water, and fisheries, often by the powerful few, caused changes to the environment, often harming the most vulnerable people who depend on natural resources for their livelihood

Biodiversity also provides critical 'ecosystem services' on which development depends, including air and water purification, soil conservation, disease control, and reduced vulnerability to natural disasters (e.g. floods, droughts and landslides). Loss of biodiversity exacerbates poverty, and likewise, poverty is a major threat to biodiversity.

The United Nations Development Program (UNDP) made 'Biodiversity for Development' a prime focus of its Energy and Environment Practice. UNDP helps more than 140 countries use biodiversity sustainably through

its Biodiversity Global Programme, Equator Initiative and Global Environment Facility (GEF). The Millennium Goals recognise environmental sustainability is part of global economic and social well-being and people living in poverty must be seen as part of the solution rather than part of the problem.

Graph: Percentage of poorest living on fragile land



World Bank, Source: www.ris.org.in/abdr_ mar042.pdf

Q. Local – global action _____

In 1972, the United Nations Conference on the Human Environment established the United Nations Environment Programme (UNEP). Governments agreed to tackle issues, such as protecting wetlands and regulating the international trade in endangered species, and controlling toxic chemicals and pollution. It helped slow biodiversity destruction but was unable to reverse it.

In 1987, the World Commission on Environment and Development concluded that economic development must become less ecologically destructive. In its landmark report, Our Common Future, it said: *'Humanity has the ability to make development sustainable-to ensure that it meets needs of the present without compromising the ability of future generations to meet their own needs*. It also called for *'a new era of environmentally sound economic development*.

In 1992 the Convention on Biological Diversity became the first global agreement on the conservation and sustainable use of biological diversity. The Convention ratified by more than 187 countries has three main goals: conservation of

R. Millennium Development Goal 7: Ensure environmental sustainability _

The adoption of the Millennium Declaration, by governments around the world, paves the way to address poverty eradication and sustainable development. Millennium Development Goal (MDG) 7 focuses on environmental sustainability. Biodiversity plays an important role in ensuring that MDG Target 7 is achieved.

Millennium Development Goal 7

Target 7a: Integrate the principles of sustainable development into country policies and programmes; reverse loss of environmental resources.

biological diversity, sustainable use of its components, and fair and equitable sharing of the benefits from the use of genetic resources. It recognises biological diversity is not only about plants, animals and micro organisms and their ecosystems – but about people and their need for food security, medicines, fresh air and water, shelter, and a clean and healthy environment in which to live.

Declining biodiversity led to the United Nations declaring 2010 the International Year of Biodiversity (IYB).

It aims to:

- increase worldwide awareness of the importance of biodiversity
- engage more people in its conservation
- halt the loss of biodiversity
- celebrate the success stories

The Australian government established a National Strategy for the Conservation of Australia's Biological Diversity (1996) and supports the IYB (2010).

Target 7b: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss:

- 7.1 Proportion of land area covered by forest
- 7.2 CO₂ emissions, total, per capita and per \$1 GDP (PPP)
- 7.3 Consumption of ozone-depleting substances
- 7.4 Proportion of fish stocks within safe biological limits
- 7.5 Proportion of total water resources used
- 7.6 Proportion of terrestrial and marine areas protected
- 7.7 Proportion of species threatened with extinction

PROMOTE GENDER ACHIEVE UNIVERSAL REDUCE ERADICATE EXTREME EQUALITY AND CHILD MORTALITY **PRIMARY EDUCATION POVERTY AND HUNGER EMPOWER WOMEN** 5 COMBAT HIV/AIDS. GLOBAL ENSURE **IMPROVE MATERNAL** MALARIA AND OTHER ENVIRONMENTAL PARTNERSHIP FOR HEALTH DISEASES DEVELOPMENT SUSTAINABILITY

Source www.ifrc.org/what/disasters/about/factors/underdevelopment.asp

Diagram: Millennium Development Goals

Achieving human development while overcoming, rather than exacerbating environmental challenges – such as the degradation of land, watersheds and marine fisheries, deforestation, pollution, and climate change – is an immense but central challenge to humanity. Environment and Human Well-Being presents principles upon which each country can determine the most appropriate steps to take towards achieving environmental sustainability.

Table: Examples of Country/Context-Specific MDG7 Targets adapted

Forest cover

- maintain at least 60% of the country under forest cover in perpetuity (Bhutan)
- maintain forest cover at 60% (2000 level) through 2015 (Cambodia)
- increase forest cover from 8.2% in 2000 to 9.0% in 2015 (Mongolia)
- increase afforestation rate from 27% to 35% by 2040 (Romania)
- increase forest cover from 11.9 million ha in 2000 to 12.8 million ha in 2015 (Senegal)
- increase forest cover by 115,000 ha between 2002 and 2006 (Tunisia)
- extend forest cover to 43% by 2010 (Viet Nam)

Protected areas

- increase ratio of protected territories from 34.9% in 1990 to 35.9% in 2015 (Bulgaria)
- maintain 23 protected areas (3.3m ha, 1993) and 6 forestprotected areas (1.35m ha) through 2015 (Cambodia)
- increase proportion of areas covered by natural protectorates to 25% by 2015 (Egypt)
- protected areas and reserves to cover 10.8% of the national territory (Gabon)
- increase area protected to maintain biological diversity from 0.2% in 1990 to 1.9% in 2015 (Kyrgyzstan)
- increase land area protected to maintain biological diversity from 13.2% in 2000 to 30% in 2015 (Mongolia)
- increase proportion of protected land area from 2.56% in 1990 to 19% by 2015 (Romania)
- increase area protected for biological diversity from 8% in 1990 to 12% in 2015 (Senegal)
- expand network of national and biosphere reserves and national parks to 10.4% of overall territory (Ukraine)

Source: www.wri.org/publication/content/8026

S. Citizenship

i. Australian government AusAID

Environmental sustainability is a major focus of the Australian government's aid programme. This includes tackling the effects of climate change, increasing food security and protecting livelihoods in the Asia-Pacific region. The government is committed to protect biodiversity through the Millennium Development Goals and supports multilateral agencies and initiatives such as the Global Environment Facility (GEF) and the United Nations Environment Program (UNEP). Programs supported by AusAID include: Diagram: Millennium Ecosystem Assessment on Biodiversity



Source: http://en.wikipedia.org/wiki/ File:MEAConservationStrategies.jpg

This image illustrates the relationship between biodiversity, ecosystem services, human well-being, and poverty. It shows areas where conservation strategies, planning, and intervention can alter the drivers of change from local, regional, to global scales.

The conservation and sustainable use of biodiversity needs to become an integral component of economic development. There also needs to be: equitable sharing of the benefits of biodiversity, conserving the Earth's biological wealth, building national capacity and expertise (managing protected areas, conducting biodiversity inventories), and maintaining the provision of goods and services. Unsustainable management of ecosystems, such as coral reefs can reduce their ability to provide goods and services.



Australian Government AusAID

- Mekong River management of resources
- International Forest Carbon Initiative (IFCI) reduce carbon emissions from deforestation
- Clean Energy Financing Partnership Facility provide financial and technical support to clean energy
- Laos preserve forests by growing food sources for animals

ii. World Wildlife Fund (WWF)

The World Wildlife Fund (WWF) is a non-government organisation (NGO) that promotes ecological sustainability. Known by its Panda logo, it has 5 million supporters and offices in 90 countries. Since 1985, WWF has invested US\$1 billion in more than 12,000 projects. Currently there are more than 2,000 WWF conservation projects around the world. They range from school nature gardens in Zambia to packaging in local supermarkets, and from the restoration of orangutan habitats to the establishment of giant panda reserves.

A successful initiative is the 'End the Ivory Trade in Thailand' campaign. The WWF recently introduced the global 'go dark' for Earth Hour. Famous landmarks, from Sydney's Opera House to San Francisco's Golden Gate Bridge, turned off their lights for one hour. The WWF's 'Stop Overfishing' campaign was the world's first virtual demonstration. About 22,000 people signed the WWF digital petition. The campaign was a success when

Diagram: WWF's six major areas of long term conservation

ministers agreed to a new fishing policy that met most of WWF's demands.

The World Conservation Union (IUCN) lists the status of the polar bear as 'vulnerable' on its list of threatened species. There are about 25,000 polar bears in the Arctic, but this could change if the Arctic continues to warm. The Polar Bear Tracker website is part of a study on the impact of climate change. Two polar bears, Lena and Yana, are tagged with radio collars, which beam their positions via a satellite to the WWF website.

The WWF identified 200 eco-regions to be preserved and focuses on six areas for long term conservation forests, fresh water, oceans and coasts, climate change, toxic chemicals and species. All projects play a part in the campaign to stop the degradation of Earth's natural resources and conserve biodiversity

The WWF, like Greenpeace, exists `because the fragile Earth deserves a voice. It needs solutions. It needs change. It needs action.'



What can you do as informed, responsible active citizens?

"Only when the last tree has died and the last rive been poisoned and the last fish been caught will we realise that we cannot eat money." Cree proverb

Education for Global Citizenship is:

- asking questions and developing critical thinking skills about biodiversity
- equipping young people with knowledge, skills and values to participate as active citizens to reduce threats to biodiversity
- acknowledging the complexity of global issues such as biodiversity and its sustainable management

- revealing the global as part of everyday local life, whether in a small village or a large city – interdependence of species
- understanding how we relate to the environment and to each other as human being

Geography Stage 6 Syllabus and Biodiversity

Preliminary Course: Year 11	HSC Course: Year 12
Biophysical Interactions	Ecosystems at Risk
(45% of course time –	(33.3% of course time –
54 hours)	40 hours)



Geography Stage 4/5 Syllabus and Biodiversity

Stage 4: Years 7–8 Cross curricula features: Environment, Civics and Citizenship

Interaction of physical and human environments: global environments (coasts, coral reefs, deserts, grasslands, mountains, polar, rainforests, rivers, tundra, wetlands); biotic processes; ecological sustainability; natural resources (distribution, access and use); global organisation involved in promoting ecological sustainability; global issues (threatened habitats, use of ocean resources, land degradation, climate change, access to fresh water)

Stage 5: Years 9–10 Cross curricula features: Environment, Civics and Citizenship Australia: unique flora and fauna; hazards (bushfires, floods, droughts).

Issues: land, water, coastal and waste management. Ecological sustainability



Food web, Cuba. Source: Robert Pearson

Activities

Global Education

International Year of Biodiversity – www.globaleducation.edna.edu.au/globaled/go/pid/4120

What is biodiversity? Why is it important? What are the main causes of biodiversity loss? List ten examples of positive progress.

Case Study: Sweet potato diversity in Papua New Guinea – www.globaleducation.edna.edu.au/globaled/go/pid/4120

International Year of Biodiversity – www.cbd.int/2010/ welcome/; www.cbd.int/2010/about/

Global Education OzProjects

International Year of Biodiversity – quizzes, information and multimedia. – www.ozprojects.edu.au/course/view. php?id=127

Create and save an Avatar – www.karooba.com/Karoobatar/ tabid/87/Default.aspx

On line activities to learn about biodiversity – www.ozprojects.edu.au/mod/resource/view.php?id=3157 (*iwb* – *interactive white board*)

- * Quizzes *iwb* www.naturedetectives.org.uk/play/quiz/
- Online games *iwb* www.naturedetectives.org.uk/play/ games/
- Watch videos of endangered mammals *iwb* www.arkive.org/mammals/a.html
- * Watch biodiversity video clips *iwb* http://url.edna.edu.au/4rvX
- Play interactive games *iwb* www.arkiveeducation.org/ games.html; http://kids.cbd.int/index.htm
- * Explore Biodiversity Hotspots around the world using an interactive map *iwb* – www.biodiversityhotspots.org/xp/ Hotspots/pages/map.aspx

- * Explore Australia's National Biodiversity Hotspots on an interactive map *iwb* – www.environment.gov.au/ biodiversity/hotspots/national-hotspots.html
- * Use the Australian Government's My Environment website to create a report about the environment near your school – www.environment.gov.au/erin/ myenvironment/about/index.html
- * Take a virtual trip up a New Zealand creek to learn how fresh water supports life *iwb* – www.biodiversity.govt. nz/kids/index.html
- * Find out who is eating who in the ocean and build your own food chain *iwb* – www.environment.gov.au/coasts/ discovery/who-eats-who/flash/foodchain.swf
- * Learn about biodiversity on a virtual hike to the ocean in California, USA *iwb* – www.researchlearningcenter. com/samo/education/biodiversity/jrbioPreloader.swf
- Design a panda habitat *iwb* http://nationalzoo.
 si.edu/Education/ConservationCentral/design/daph_ broadband.htm
 http://nationalzoo.si.edu/Education/ ConservationCentral/design/daph_modem.htm
- * Take some virtual forest walks *iwb* http://nationalzoo.si.edu/Education/ ConservationCentral/walk/default.cfm
- * Take the panda challenge *iwb* http://nationalzoo.si.edu/Education/ ConservationCentral/challenge/index_broadband.htm – http://nationalzoo.si.edu/Education/ ConservationCentral/challenge/index_modem.htm
- * Read a story online about the biological diversity of forests *iwb* – www.unep.org/PDF/Togu_Book_Layout.pdf

Youtube and videos

- * Welcome Statement from UNEP Executive Director on the International Year of Biodiversity (4.03 min) – www.youtube.com/watch?v=OwRqlA-TvDU
- 2010 International Year of Biodiversity www.youtube.com/watch?v=4Rt2zHOJiQw
- Official video of the International Year of Biodiversity 2010 (8.27 min) – www.youtube.com/ watch?v=V1VYmpTikgw
- * African elephants, Beluga whale, Bengal tiger, Gorillas, Giant panda, Leatherback turtle and more – www.panda.org/news_facts/multimedia/video/index.cfm
- Video Burning Season www.theburningseasonmovie. com/; www.abc.net.au/atthemovies/txt/s2603294.htm It's about the problem of deforestation in Indonesia and the subsequent burning of the forests to clear the land for plantations of palm trees for their oil. The orangutan is decimated in the process. The burning is responsible for 20% of the world's carbon emissions.

Fieldwork/excursions

- * Classroom ecological sampling www.countrysideinfo. co.uk/biol_sampl_cont.htm. Estimate species in quadrants and complete vegetation transect of a sclerophyll forest, wetland or sand dune. Compare the transect with one conducted in your local area
- * Describe the ecosystem you live in. What plant and animal species have you observed over a period of a week? Divide the list into native and exotic/feral. Research the endangered species in your local area? List

the threats to biodiversity in your local area. Describe the local council activities to reduce the decline in these species

- Visit different ecosystems located along coasts or in forests, wetlands, rivers, agriculture and urban landscapes. List the biodiversity in each ecosystem. Research threats to the biodiversity and sustainable management strategies
- * Organise activities for World Environment Day 5 June 2010, National Landcare Week 6–12 September and Coastcare Week 6-12 December 2010

Research

- * What is meant by the following phrases: web of life, biodiversity is life, biodiversity is our life, biodiversity is more than the loss of Pandas, and biodiversity is the rock on which you stand.
- Biological diversity is the variability among living organisms on the earth, including the variability within and between species and within and between ecosystems. Explain what this means
- People rely directly on the diversity of life-forms for shelter, food, goods, services and their livelihoods.
 Explain how you rely on biodiversity over a period of one day.
- * Since we rely heavily upon the natural environment, it is in our best interests and in the interests of future generations to protect the Earth's biodiversity. Explain this statement
- * Explain why biodiversity is essential for sustaining life on earth, addressing poverty and preserving cultural diversity and identity.
- * Imagine you were on the 2010 International Biodiversity Committee. Present a report on how you would conserve global biodiversity

ICT

- Describe the Convention on Biodiversity – www.cbd.int/
- * Explain the aim of International Year of Biodiversity 2010 – www.cbd.int/2010/
- * Discuss the relationship between the United Nations Millennium Development Goals (MDGs) and biodiversity – www.un.org/millenniumgoals/; www.ris.org.in/abdr_mar042.pdf
- * Explain the sustainable schools project http://sustainability.ceres.org.au/schoolProjects.php?acti on=project&projectsId=12
- * Compare your school's ecological footprints with other schools – http://sustainability.ceres.org.au/files/sff.htm (energy, water ,waste, biodiversity eco-footprint); www.epa.vic.gov.au/ecologicalfootprint/calculators/ school/introduction.asp. Explain how the school's EF could be reduced
- * What is countdown 2010? www.countdown2010.net/ year-biodiversity
- * Discuss the purpose of the International Union for Conservation of Nature – http://iucn.org/iyb/
- * Explain why we need to protect biodiversity www.up2meforkids.com.au/popup3.php?Do=ContentVi ew&pageno=115

- * List ten IUCN Threatened Species www.iucnredlist. org/; www.iucnredlist.org/news/iucn-red-list-site-madeeasy-guide
- * Discuss the aim of the United Nations Environment Programme – www.unep.org/Documents.Multilingual/ Default.asp?ArticleID=6182&DocumentID=585&l=en
- * Backyard diversity activities www.csiro.au/csiro/ channel/pchek.html
- Games: match animals with habitats/ecosystems www.environment.nsw.gov.au/edresources/ MatchTheAnimalsToTheirHabitats.htm
- * Fun and games www.panda.org/news_facts/ multimedia/fun_games/index.cfm – Baltic Marine Rescue, The Seagull Strikes Back, Switch 'em off, Toxic Blaster, Caught in the Act, Rescue the Russian Leopard, Poacher Peril, Shop 'n Save, Wild Guesses.
- Threatened species and ecological communities www.environment.gov.au/biodiversity/threatened/ publications/index.html
- * Eco Friendly Kids www.ecofriendlykids.co.uk/ BiodiversityNature.html
- * Biodiversity for Kids www.environment.nsw.gov.au/ edresources/TeachersKitBiodiversity.htm
- * Australia's biodiversity www.environment.gov.au/ biodiversity/
- * National Strategy for the Conserving of Australia's Biological Biodiversity – www.environment.gov.au/ biodiversity/publications/strategy/index.html
- * Threatened species www.iucnredlist.org/documents/ summarystatistics/2009RL_Stats_Table_1.pdf
- * Endangered species http://en.wikipedia.org/wiki/List_ of_endangered_species
- * WWF Projects www.panda.org/about_wwf/where_ we_work/project/project_map/index.cfm
- * Climate change and the Orangutan http://assets.wwfid. panda.org/downloads/orangutan_impact_en_lores.pdf
- * Tiger quiz www.worldwildlife.org/how/fun/item3045.html
- Rhino quiz www.worldwildlife.org/how/fun/item3046. html
- Interactive map: Top ten Tiger trouble spots in 2010

 www.worldwildlife.org/who/media/press/2010/
 WWFPresitem15288.html
- * Tigers on the Brink: Greater Mekong– www.worldwildlife. org/species/finder/tigers/WWFBinaryitem15019.pdf
- Conserving Tigers WWF 2002–2010

 www.worldwildlife.org/species/finder/tigers/ WWFBinaryitem9365.pdf
- * Teachers lesson plans and resources http://www.panda. org/news_facts/education/teacher_resources/index.cfm
- * Living Planet Report WWF 2008 www.panda.org/ about_our_earth/all_publications/living_planet_report/
- * Map of Plant Biodiversity –www.sciencedaily.com/ releases/2007/03/070320191114.htm

Google Earth

* Follow polar bears using Google Earth – www.panda.org/about_wwf/where_we_work/europe/ what_we_do/arctic/polar_bear/about/tracking/ googleearth_pbt/index.cfm



Fostering cultural diversity constitutes one of the most pressing contemporary issues. It is central to recognising the diversity of the world's cultures and the links uniting them. 'The objective of the International Year is to help dissipate any confusion stemming from ignorance, prejudice and exclusion that create tension, insecurity, violence and conflict' ... 'Exchange and dialogue between cultures are the best tools for building peace.'

> Ms Bokova Director-General, United Nations Educational, Scientific and Cultural Organisation (UNESCO)

'The year 2010 celebrates the International Year for the Rapprochement of Cultures. The main goal of the Year will be to demonstrate the benefits of cultural diversity by acknowledging the importance of the constant transfers and exchanges between cultures and the ties forged between them since the dawn of humanity. As cultures encompass not only the arts and humanities, but also lifestyles, different ways of living together, value systems, traditions and beliefs, the protection and promotion of their rich diversity invites us to rise to new challenges at the local, national, regional and international levels. This will involve integrating the principles of dialogue and mutual knowledge in all policies, particularly education,

science, culture and communication policies, in the hope of correcting flawed cultural representations, values and stereotypes.' UNESCO will play a leading role in the celebration of the Year – www. unesco.org/culture/ pdf/2010/2010 leaflet en



Implementation

The main types of activities include:

- research, meetings, public debates, exhibitions, festivals, museums and art galleries - illustrating exchanges and transfers between cultures
- new technologies that foster linguistic diversity and translation
- an integrated vision of all aspects of cultural heritage as a: bearer of history that must be preserved; resource and engine of sustainable development; and tool for intercultural dialogue, including interreligious dialogue
- improved access to education, with an emphasis on quality education for 'all' that includes education on human rights, cultural diversity, gender and the integration of marginalised people.

contribution of the media and new communication and information technologies to change the perception of different cultures and religions through the promotion of dialogue on the Internet where numerous cultural and linguistic expressions can be circulated particularly on controversial issues

> Top photograph: Central America, Guatemala traditional weaving. S. Bliss

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INTERNATIONAL YEAR FOR THE RAPPROCHEMENT OF CULTURES

- recognition of and respect for knowledge including traditional knowledge and the knowledge of indigenous peoples – which contributes to sustainable development.
- promotion of human rights and intercultural dialogue, with particular emphasis on fighting racism and discrimination as well as on the culture of peace and democracy.



Activities

International Year for the Rapprochement of Cultures – http://portal.unesco.org/culture/en/ev.php-URL_ ID=39761&URL_DO=DO_TOPIC&URL_SECTION=201. html

Language Matters – www.ozprojects.edu.au/course/view. php?id=33

Languages in a globalised world – www.globaleducation. edna.edu.au/globaled/go/pid/3728

Learning about language use - http://url.edna.edu.au/7SvH

Learning languages – http://url.edna.edu.au/xgcp

Multi-literacies and communications media – http://education.qld.gov.au/corporate/newbasics/html/ curric-org/comm.html

Diversity – www.globaleducation.edna.edu.au/globaled/ go/pid/2848

Making Multicultural Australia – www.multiculturalaustralia.edu.au/

Racism No Way – www.racismnoway.com.au/

Living in Harmony – www.harmony.gov.au/

Voices of Australia: 30 years of the Racial Discrimination Act: 1975-2005, a collection of real-life stories about Australians living together – www.humanrights.gov.au/racial_discrimination/voices/ index.html

Building Bridges: A Peace Corps Classroom Guide to Cross-Cultural Understanding – www.peacecorps.gov/ wws/publications/bridges/pdf/BuildingBridges.pdf

Challenging stereotypes – www.globaleducation.edna.edu. au/globaled/go/pid/2622

INKCINCT Cartoons: Social and political cartoons with a slightly black and esoteric flavour. They relate to Australian and World issues but from an Australian perspective – www.inkcinct.com.au/

Cartoons from New Internationalist – www.newint.org/themes/cartoon/cartoon.htm

Importance of communicating international years

To inspire informed, responsible local – global citizenship it is important to communicate strong messages. Communications can succeed if the message:

- creates excitement around the discovery that people are part of nature and intertwined with biodiversity and the contributions of cultures to the global melting pot;
- highlights the opportunities to safeguard biodiversity and reduce racism to create better lives; and
- creates a strong sense of optimism that together we can make a difference.

The table outlines five different types of messages for schools.

What	Purpose
Slogan	The 'hook' designed to grab attention and leave people wanting to know what this is all about.
Discoveries	The 'what' deliver the core messages
Boilerplate	The 'why' provides a short overview and rationale for the International Year of Biodiversity and Rapprochement of Cultures
Narrative	The 'why' the story behind biodiversity and culture
Call to action	The 'how' specific calls to action, to be added by schools.

INTERNATIONAL YEAR FOR THE RAPPROCHEMENT OF CULTURES

Photography: Culture and Biodiversity

Photography can improve understanding provide vibrancy to the communication of international years.

Photographs 1–7 courtesy of S. Bliss and J. Bliss

Photograph 1: Panama: Chagres National Park – Embera Indians



Photograph 2: India: Thar Desert



Photograph 3: Cuba – African influence. Multicultural parade



International Year for the Rapprochement of Cultures



W RAPPROCHEMENT of CULTURE

INTERNATIONAL YEAR FOR THE RAPPROCHEMENT OF CULTURES



Photographs 4, 5, 6 and 7: Tibet





Activities

Refer to the photographs. Discuss how culture and biodiversity are encapsulated in the photographs

Which sketch relates to what international year? Give reasons for your explanations



Design a poster or webpage celebrating the InternationalYear of Biodiversity or the Rapprochement of Cultures

Draw a sketch of photograph 7 in Tibet. Label the sketch relating to environment (ecosystem) and culture. Compare your lifestyle with this photograph.





Dr. Anne Power, music lecturer at the University of Western Sydney, professionally organised and implemented an excellent Global Ripples Project in 2008 and 2009. Twelve teams of students in 2008 and nineteen teams of students in 2009 showcased their 'Global Ripples' projects in a series of lively presentations and role plays at the Kingswood campus on 25 September 2008 and 23 November 2009. The Global Ripples Project is a partnership between the University of Western Sydney (School of Education) and Global Education to promote a global perspective across curriculums.

The Project involved university students, high school students and primary school students:

 2008: involved pre-service teachers from the UWS mentoring 24 Year 8 students from Penrith High School. In turn, the Year 8 students mentored 48 Year 5 and 6 students from Colyton Public School, hence the rippling effect. The Year 5 and 6 students designed projects with their Year 8 mentors and their UWS preservice teachers.









East Public Schools. The Year 5 and 6 students designed projects with their Year 8 mentors and the UWS pre-service teachers. They researched global warming, poor sanitation and poor working conditions in countries outside Australia, using global education resources. They investigated issues of sustainability and inequity.

Examples of global education resources used by the students (from Professional Teachers' Council NSW)



In 2008 students researched global warming, poor sanitation and poor work conditions in countries outside Australia. They delved into their own families' histories and considered ways to create a more just and peaceful society. Activities included:

- 1. The Eight Musketeers developed an interactive web page and placed it on MySpace to raise awareness of poverty. Its content was outlined in their PowerPoint presentation. Geoff Yates, the Principal of Colyton Public School, was chosen from the audience to explore the site via a laptop.
- 2. Lifting the Lid developed a PowerPoint and a poster highlighting poor living conditions in developing countries. Their research was compared with their own living conditions in Australia.
- 3. UN Cool Kids role-played a hypothetical debate at the UN about cruelty to animals.
- 4. SuperCalaFreakingAwesome produced a book with illustrations and information on their families' history. Each member focused on one ancestor who had emigrated

- 5. The Gap role-played a scenario and displayed a poster about the differences between quality of life in Australia and in developing countries.
- 6. The Mugabe Madness team presented an engrossing role-play as well as a PowerPoint around 2008 events in Zimbabwe.
- 7. Soul of my Shoe explored working conditions and practices used to make shoes in developing countries.
- 8. Global Connections Airlines created excitement with the audience vociferously participating in an auction of different countries.
- 9. Presenting against Poverty performed a script highlighting the prevalence and impact of poverty.
- 10. Operation Extreme Penguin Justice presented the effects of global warming. It was assisted by 3D penguins made from recycled materials, and a video of these sculptures intercut with actual penguins.
- 11. Deserted Down Under explored a scenario where Australia had been cut off from the rest of the world.
- 12. The Racism Information Group (R.I.P) presented a short film to draw attention to the negative impact of racism.

GLOBAL RIPPLES PROJECT

In 2009 the cluster operated in the following way. On 22 September, UWS ran a day in which 16 pre-service teachers met with 29 high school students from Penrith and discussed the nature of mentoring and the skills it involves. There were practical activities in which secondary and tertiary students were engaged. On 25 September, the group of pre-service teachers and high school students came together with 90 Colyton Public School and Blaxland East Public school year 5 and 6 students. They spent the day, after some initial icebreaking activities based around an environmental rap, deciding what their project would be. To this end, they used AusAID resources such as *Potatoes;* and *Climate* Change – A Topic Generating a Lot of Heat. By day's end, the 12 groups decided the main ideas for their project and organised tasks for the members of their group.

On 19 November, another whole day meeting was held at Penrith High School, with students accessing the internet, making films, constructing the beginnings of PowerPoint displays and role plays, and making posters. In the month between this meeting and the Showcase, the students kept in contact by email and some groups chose to meet for specific purposes such as the completion of the MySpace page.

On 25 September 2008 and 23 November 2009 the Global Ripples Showcase was held, attended by parents, UWS academics and the schools involved with UWS. Director Dr Susan Bliss and secondary manager Sue Field attended. The enthusiasm and inventiveness of the students is clear in the varied and interesting presentations and performances, and clearly the project built their skills in research, analysis, teamwork and communication, as well as their knowledge of crucial global issues.



Dr Anne Power who managed the Global Ripples Project must be congratulated. Anne is senior Lecturer in Music in the School of Education. She has an extensive music teaching background and a long service to music Professional Teaching Associations and to the Board of the Professional

Teachers' Council NSW (PTC NSW). Anne is regularly invited to present at Australian and international music education research conferences. She is chair of the Australian and New Zealand Association for Research in Music Education; deputy chair of the NSW Chapter of the Australian Society for Music Education; and Treasurer of the Institute for Education Research. Anne is also editor of the journal *Musicworks*, the national journal of the Australian National Council of Orff Schulwerk.

In the publication, *Issues in Educational Research, Vol* 20(1), 2009, Anne's research focused on community engagement as authentic pedagogy.

NAMASTE! COMMONIVEALTH GAMES DELHI 2010



Websites -

http://en.wikipedia.org/wiki/2010_Commonwealth_Games http://en.wikipedia.org/wiki/Commonwealth_Games www.thecgf.com/ http://www.cwgdelhi2010.org/

Activities -

Where is Delhi located? Describe the climate in October What countries comprise the Commonwealth? List the advantages of the Commonwealth Games to India (e.g. economic, social, cultural and political) What does it mean 'Uniting the Commonwealth through Sport

Above: Hindi version of CGF logo – http://publicity.delhigovt.nic.in/ admin/eng/photoGallery/uploadPhotoGallery/1/172.jpg A crowd of almost 60,000 was treated to a stunning opening ceremony for the XIX Commonwealth Games at the Jawaharlal Nehru stadium in New Delhi.



Image source: http://wwos.ninemsn.com.au/glanceview/121223/ commonwealth-games-opening-ceremony.glance

CLOBAL GLOBAL EDUCATION PROJECT EDUCATION NATIONAL MEETING 2010

Adelaide 17–18 February 2010 Dr Susan Bliss, Director Global Education NSW

The annual global education meeting held in Adelaide was attended by over thirty global educators across Australia. The eight people invited from New South Wales to attend were: Dr Ruth Reynolds (Newcastle University), Dr. Anne Power (University of Western Sydney), Dr John Buchanan (University of Technology), Kate Keeley (University of Sydney), Nick Hutchinson (Macquarie University), Sue Field (GTANSW), Dr Susan Bliss (NSW Director) and Kim Tsolakis (Executive Officer Professional Teachers' Council NSW). Speakers included Arthur Burch (National Manager Global Education/AusAID), Professor Cathie Holden (University of Exeter, UK) and Claire Ireland (AusAID Environment Adviser). Overseas attendees included Kajsa Higgins (University of Linnaeus Sweden), Maj Stoddard (World Children's Peace Prize Sweden) and Yutaka Kimura (University of Shiga Japan).

Professor Cathie Holden discussed the importance of moving beyond the 'school walls' because of the growing interdependence of people and communities. She focused on the importance of acquiring global education knowledge, skills and values to enable students to act as informed, responsible citizens. Cathie discussed the challenge of teaching about community and how to engage in activities to help students think about sustainability and the ways in which successful communities are managed and governed.

Malcolm McInerney (GTASA) and Paul Foley (HTASA) explained how to incorporate Global Perspectives into the Geography and History National Curriculums.

Attendees visited the South Australian Museum to obtain a clearer understanding of our Pacific Neighbours. This was an invaluable experience as GTANSW is conducting workshops on the Pacific Islands in 2010, supported by global education resources.

Global Education Pacific -

www.ozprojects.edu.au/course/view.php?id=126; www.globaleducation.edna.edu.au/globaled/go/ cache/offonce/pid/140;jsessionid=1AC79D2ED891F90 46625B83FCD4D88DE

Social Educators' Association of Australia (SEAA) Conference 2010

Global educators also attended the biennial Social Educators' Association of Australia (SEAA) conference held in Adelaide 19th -20th February. Educators at the conference were provided with knowledge and understanding of sustainability, globalisation, global citizenship and social justice.

The main power behind the conference was Margaret Calder supported by Ruth Reynolds (SEAA President), Adele Pring (SASOSE President), Mark Wildy and Francine Smith (Global Education South Australia). Tim Costello (Chief Executive of World Vision) spoke on social justice, Professor Cathie Holden on global citizenship, Professor Robert Gilbert on sustainability and Mr Hieu van Le (OA Lieutenant Governor of South Australia) presented the opening address on global citizenship. Each day the

conference was opened with music such as *Songs for Aboriginal Studies and Reconciliation*, performances by the Burundi drummers, and Borders a multi-award winning Scottish/ Irish/Australian band.



Photograph: Tim Costello Chief Executive, World Vision

The following New South Wales global educators presented excellent papers and workshops:

- Dr John Buchanan: *Tertiary institutions as a locus of practice for education for sustainability; Federating and speed dating*
- Ms Sue Field: *Taking local action for climate change through global issues* (Burning Season DVD). Sue is presenting this workshop across NSW during 2010
- Dr Anne Power: Global citizenship through music education
- Ms Kate Keeley and Mrs Kate Smyth: Approaches and issues in teaching global citizenship
- Dr Bronwyn Cole: *Developing global understanding in young children: the soup company storypath*
- Dr Ruth Reynolds and Joanna Brown: Social justice and school communities: using a school linkage program to further students' understandings of social justice
- Dr Ruth Reynolds: *Peaceful pedagogy 1: the role of human rights education in developing a culture of peace in schools*
- Mr Milton Brown: Surfaid International social action for sustainability, global citizenship and social justice forum; Developing global citizens - using the achievements and challenges of SurfAid international as an example
- Mr Rod Yule: *World Vision Globalisation, Human Rights and Poverty*

Beside academic papers and teacher workshops, schools presented global education projects. St Mary's College and Christian Brothers' College Year 11 students worked in orphanages in Vietnam for two weeks. Adrian Francis – Concordia College Year 12 students visited one of the poorest communities in South Africa to tutor students before their matriculation exams. The community had been devastated by HIV/AIDS.



Photograph: Milton Brown (Surfaid International) at left and Nick Hutchinson (Macquarie University) at an Ethiopian restaurant located at Hindmarsh, Adelaide venue for the conference dinner.

by Murray Kerstens, Kincoppal RoseBay



This teaching program was written by Murray for the Asia Education Foundation. It is designed to support the resource *Pacific Neighbours: Understanding the Pacific Islands* produced by AusAid for the Global Education project.

This teaching program was presented at both the Global Education workshops and the Skills workshops around the State this year.

The program is one example of where this resource can be used in geography to include the Pacific as a case study. It is not intended that this program be used in its entirety. It is best modified to include a range of other resources on the Pacific region.

The resource *Pacific Neighbours: Understanding the Pacific Islands* and a map of the Pacific region can be purchased from the Global Education Project, through PTC NSW.

Focus area	5A4 Australia in its Regional and Global Contexts
Focus	Australia in its regional and global contexts and the roles of individuals and groups in planning for a better future.

Outcomes

- 5.2 analyses, organises and synthesises geographical information
- 5.3 selects and uses appropriate written, oral and graphic forms to communicate geographical information
- 5.4 selects and applies appropriate geographical tools
- 5.7 analyses the impacts of different perspectives on geographical issues at local, national and global scales
- 5.8 accounts for differences within and between Australian communities
- 5.9 explains Australia's links with other countries and its role in the global community
- **5.10** applies geographical knowledge, understanding and skills with knowledge of civics to demonstrate informed and active citizenship.

Suggested ICT

Design and create a multimedia presentation or web page to communicate geographical information to a particular audience, including maps and diagrams as appropriate.

Resources (Include resources available within your school and community.) There are a variety of commercial textbooks that can support the tasks outlined in this topic to provide background for students and that have skills based activities incorporating mandatory tools. The use of the Internet is assumed as a source of information.

Websites

www.cia.gov/library/publications/the-world-factbook/ www.spc.int/corp/ www.ausaid.gov.au/country/southpacific.cfm www.spc.int/piocean/CROP/cropbrochure.pdf www.mfat.govt.nz/Foreign-Relations/Pacific/index.php www.forumsec.org.fj/pages.cfm/about-us/ www.teara.govt.nz/NewZealanders/MaoriNewZealanders/en www.samoa.co.uk/tattoos.html www.amplifier.co.nz/artist/8345/feelstyle.html www.screenaustralia.gov.au/learning/ www.abc.net.au/pacificstories/pdf/joemonicaleo.pdf http://southseas.nla.gov.au/index.html www.ramsi.org/ www.dfat.gov.au/geo/solomon_islands/solomon_islands_brief.html www.climatechange.gov.au

Learn abouts	Teaching and learning activities
The place of Australian in the	Taak 1 Australia's Desitie paighbourg
 Australia's location in relation to its near neighbours and their 	In pairs complete the Pacific Quiz and share your knowledge and understanding with other in your class.
	Task 2 Australia's neighbours and boundaries
 locate Australia in the Asia– Pacific region and the world 	Students to complete the map reading exercise using Pacific Map on Page 56-57. Share results with the class to come to a consensus on the following questions:
	Who are Australia's Pacific neighbours and what are your reasons for this opinion?
1236 V.S.V.	What is Australia's relationship with the Pacific region?
VIII VIII	Select a person to report your findings and reasons to the class.
	Task 3 Developing a Pacific Island profile
	In small groups, identify one country of the Pacific to investigate. Your research could include some or all of the following activities.
and the second	• Describe where the country is in relation to other countries in the Pacific and how you might get there from Australia.
	• Describe what it might be like to live there, including issues such as climate, history, population density, average wealth (Gross National Income), population profile and natural and environmental challenges.
	• Collect a broad range of images of the country from those on the accompanying CD-ROM and from travel advertisements and brochures, newspapers, magazines and the web. Describe what is included in each of the images. What impressions do these images give you of the Pacific island countries? How do they confirm or contest your first impressions of the Pacific island region? Do these images present the Pacific in a positive or negative way?
	Present your findings in class and compare them with the findings of others.
	Select a spokesperson to report your findings and reasons to the class.
Strange Billing	
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	WINNING STREET

Learn abouts	Teaching and learning activities			
Learn tos				
Australia's regional and global	Task 4 Posters on regional links			
 the ways Australia interacts with other patients including; 	In groups choose one of the eight interactions between Australia and other nations listed in the syllabus.			
- aid	• Your group is to research this interaction using the library, textbook and Internet to develop a poster illustrating the main points to the rest of the class			
- communication				
– culture – defence	 Locate the nations with which Australia interacts for the allocated regional and global link, using latitude and longitude (in degrees and minutes) to locate features. 			
– migration	iocale realures.			
– tourism	 Describe the nature of the link using flow charts and a range of graphs. 			
- trade	 One member of your group is to be chosen to speak to the class about your poster. 			
 sport collect data to identify and locate nations with which 	• The posters will be displayed and each student is to summarise essential information from the posters and write a brief description (one page) of Australia's links with its neighbours in a regional and global context.			
Australia has regional and	Task 5 Regional and global Links – student survey			
nature of the links	In group students to construct a short survey. For example, ask if they know anyone who:			
communicate findings that demonstrate Australia's links	has come to Australia from a Pacific Island country			
in its regional and global context	has been to a Pacific Island cultural festival			
Contoxe	has visited any of the countries.			
	Using your findings from the survey, describe how students in your class are connected to Pacific Island countries.			
	Task 6 Connecting with the Pacific region (Pacific Islands Forum)			
	In a small group, select an issue within the Pacific region such as the Pacific Islands Forum.			
	 Which issues have strong statements attached to them and which ones use weaker language? 			
	2. How might the kind of language used in the statements indicate the level of consensus?			
	3. Why might those with weaker statements have lacked consensus?			
	Task 7 Connecting with the Pacific region (Pacific Islands in sport)			
	1. Create a pie graph showing the countries of origin of the players featured in the Brumbies photo to determine rugby the national sport for any of the Pacific Island countries?			
	2. What are the benefits to the player, the club and Australia of having players from so many Pacific countries involved in sport?			
	3. Why might there be so many Pacific Islanders playing rugby league, rugby union and netball in Australia? How might sport help promote links between Pacific Islanders, and between Pacific Islanders and Australians?			

Learn abouts	Teaching and learning activities
Learn tos	
At least ONE regional and	Task 8 Understanding why aid to Pacific nations is important?
global link chosen from aid, defence, migration or trade:the nature of the link	1. Create a table showing how the cyclone, volcano and tsunami hazards were caused, how they have affected people and the environment. Discuss how effectively the Pacific Islanders are prepared for such an impact and why aid is
• the roles of the government and of non government organisations in relation to the link	 Discuss the difficulties Tuvaluans face earning money? How have links with countries around the world assisted Tuvaluans to earn an income? What problems might Tuvalu experience from its links to other countries?
 treaties and/or agreements relevant to the link 	3. Discuss why some Pacific Island nations rely on aid as a form of income when natural disasters occur.
cultural, economic and	Task 9 Aid groupwork
geopolitical advantages and disadvantages to Australiasocial justice and equity	In small groups, consider one of the examples of the Australian aid programs and describe how aid might be changing people's lives. Consider the advantages and disadvantages of receiving aid. Develop a poster for the Australian community that communicates the benefits for Pacific Islander countries.
issues in Australia and	
other countries	lask 10 Research on a global link
 discuss the importance of relevant non government organisations in relation to the link identify and describe the purpose of a treaty and/or agreement relevant to the link outline the importance of the treaty and/or agreement to the countries involved in the link analyse the advantages and disadvantages of the link to Australia 	 Choose one regional / global link from aid, defence, migration or trade, research it and provide a written report to include: a description of the link and the countries involved an explanation of the roles and actions of different levels of government in relation to the link an analysis of the importance of relevant non government organisations in relation to the link an outline of treaties or agreements relevant to the link an outline of social justice and equity issues for the countries involved.
 recognise implications for social justice and equity in relation to the link 	

Learn abouts Learn tos	Teaching and learning activities
Future challenges for	Task 11 Learning about population pyramids
Australia: Population	Examine the population pyramids on Page 26 and complete the question of the Pacific Islands and compare these to Australia. Use the PNI chart to examine the future population challenges for the Pacific and Australia.
 Population current and future population trends: growth rates, age structure and spatial distribution government population policies to manage population growth implications of population trends: ecological sustainability population movement and urban planning identify and discuss government population policies: growth rates refugees migration analyse current and future population trends and their populations 	 Pacific Islands and compare these to Australia. Use the PNI chart to examine the future population challenges for the Pacific and Australia. Task 12 Development compass rose - group activity Use the development compass rose to examine the implications of population trends and also the Pacific challenge of looking towards a sustainable future. Task 13 Climate change role play In pairs, take one of the roles indicated in the speech bubbles on Page 52. Talk about how you feel about climate change in this role and what you would like to see done about the issues that are affecting your life. As a class, act out the roles and discuss the proposed solutions. Use the future wheel to show all the future consequences of climate change. Try to reach consensus about the way forward. Task 14 Sustainability discussion Discuss the impact of sustainable tourism and forestry on the culture, environment and economy of the Pacific Islands. Task 15 Pacific Islands population research In small groups, choose a Pacific Island country and collect a variety of images of the environment and living conditions in the country. Sort the images into two groups: one that shows the benefits of living in the country and one that shows the drawbacks of living in the country. Find out if progress can be made to address the negative features depicted in the second group of images without threatening the positive features depicted in the second group of images. Use the future line resource sheet to plan for this change. Task 16 Future population research Select an issue affecting a Pacific Island country, such as biodiversity, climate change. Ishing, looging, tourism or development. Create a fact sheet to show how
	people in Australia could change their behaviour to contribute to achieving better outcomes for Pacific Islanders

Learn abouts Learn tos	Teaching and learning activities
Future challenges for	Task 17 Peace building as a future challenge for the Pacific.
Australia: Human rights and reconciliation	In small groups, compare and contrast one Samoan example of peace-building and suggest how the actions taken would assist the people to avoid future conflict. Outline how a similar offence would be handled in Australia. What aspects of these forms of peace-building could be useful to people living in Australia? In small groups, create a mind map in one colour showing factors that contributed to the conflict in Bougainville. Using a different colour, show how these factors were addressed.
 future challenges for Australia in relation to: human rights 	
 reconciliation bow other nations have 	
responded to these challenges	
 strategies to address the challenges 	
• identify human rights agreements	
 describe responses of individuals, groups and governments in Australia to these challenges 	
 compare the responses of Australia and other nations to the challenges 	
• recognise implications for the international community	
 suggest strategies Australia can adopt to address the challenges better in the future 	
Statistics (BUSINESS	
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Geography Teachers' Association of NSW ARTHUR PHILLIP AWARDS 2010

GEOGRAPHY FIELDWORK COMPETITION

The Geography Teachers' Association of NSW (GTA NSW) organises an annual competition for students and schools to foster an enthusiasm for Geography through engagement and rewards. The emphasis of the competition is fieldwork and the gathering of primary data as part of authentic research in geography.

The competition is open to all secondary schools, both members and non-members of GTA NSW.

All the categories of the competition are based on the research action plan outlined in the syllabus on page 17 of the Years 7–10 Geography syllabus. The steps of this research plan have also been applied to the senior Geography course for the purposes of this competition and fit neatly with the Senior Geography Project.

NATURE OF THE COMPETITIONS

- 1. The GTA Fieldwork and Visual Presentation Competition (Years 7–9)
 - choose a relevant topic
 - undertake fieldwork to gather primary data
 - support fieldwork with secondary data if required
 - analyse gathered data
 - present research findings as a visual presentation (digital or poster)
- 2. The Global Education Research (Fieldwork) Competition (Years 7–12) Three categories: Stage 4, Stage 5, Stage 6
 - choose a relevant global geography topic
 - undertake research (may include fieldwork)
 - analyse data gathered
 - present research findings in a digital form
 - propose individual or group action in response to findings
- 3. The Dr Don Biddle Issues in Australian Environments Fieldwork Competition (Year 10 only)
 - undertake research into a relevant issue in NSW, using fieldwork to gather primary data
 - support fieldwork with secondary data if required
 - analyse data gathered
 - present research findings
 - propose individual or group action in response to findings

Geography Teachers' Association of NSW ARTHUR PHILLIP AWARDS 2010

NATURE OF THE COMPETITIONS

- 4. The Brock Rowe Senior Geography Project Fieldwork Competition (Year 11 only)
 - undertake a Senior Geography Project, using fieldwork to gather primary data
 - support fieldwork with secondary data if required
 - analyse data gathered
 - present research findings
 - propose individual or group action in response to findings
- 5. The Water for Life Fieldwork Competition (Years 7–10)
 - undertake research into a relevant water issue in NSW, using fieldwork to gather primary data
 - support fieldwork with secondary data if required
 - analyse data gathered
 - present research findings
 - propose individual or group action in response to findings
- 6. The Dr Maurine Goldston-Morris Civic and Citizenship Awards

There will be Civics and Citizenship Awards available for entries that demonstrate action has occured at either the individual or group level, as a result of the research/fieldwork activity. Awards may be allocated to the best action taken in Stages 4, 5 and 6.

7. The Dr Maurine Goldston-Morris Teacher Awards

These will be allocated to teachers for outstanding involvement in the Geography Fieldwork Competition during 2010.
GTA

ARTHUR PHILLIP AWARDS 2010 INFORMATION

ENTRIES

GTA Member schools – \$3.30 per entry (incl GST) Non-member schools – \$6.60 per entry (incl GST)

Each school can submit up to FOUR (4) entries in each section. Final date for entries to be received is Friday 19th November 2010.

All entries MUST have an *Entry Form* (see over page) fully completed and securely attached to be considered. Make sure the correct section is indicated on the entry form.

Entries should be sent or delivered to:

GTA NSW Office Block B, Leichhardt Public School grounds Corner Norton and Marion Streets 101 – 105 Norton St, Leichhardt 2040

Enquiries via email to Carmel Logalbo, carmel.logalbo@ptc.nsw.edu.au All packages should be clearly marked as **Geography Fieldwork Competition**.

Entries may be in a book or loose leaves (with reinforced rings), mounted on cardboard (limit 2 sheets of 65 x 55cm), PowerPoint presentation (max slide number 20) or a webpage. No models will be accepted.

All entries will be available for collection at the end of the award ceremony. GTA NSW is unable to return uncollected entries to schools.

SCHOOL REGISTRATION AND PAYMENT

Teachers will need to obtain the *School Registration and Payment Form* on the GTA NSW website at: www.gtansw.org.au. This form must be completed for the full set of student entries being submitted from the school. Payment for ALL student entries must accompany this form. This form and payment must be attached to the set of entries to be eligible for judging.

PRIZES

Prizes are substantial and vary according to section and prize donors. The Civics and Citizenship Awards are major awards.

AWARDS

Each student who submits an entry will receive a Certificate of Commendation.

Awards will be allocated to each section according to criteria. The presentation of awards will be at a special ceremony in February 2011.

GTA	ARTHUR PHILLIP AWARDS 2010
	GEOGRAPHY FIELDWORK COMPETITION

ENTRY FORM

This form MUST be fully completed and securely attached to each entry. (One form per entry – please photocopy)

PLEASE PRINT CLEARLY

EACH SCHOOL CAN SUBMIT UP TO FOUR ENTRIES IN EACH SECTION

STUDENT (full name)	
SCHOOL	
SCHOOL YEAR	
SECTION (Please tick ONE section only)	
1. The GTA Fieldwork and Visual Presentation Competition	ONLY ONE SECTION TO
2. The Global Education Fieldwork and Research Competition	BE SELECTED
3. The Dr Don Biddle Issues in Australian Environments Fieldwo	ork Competition
4. The Brock Rowe Senior Geography Project Fieldwork Compe	tition
5. The Water for Life Fieldwork Competition	++++
TITLE OF ENTRY SYNOPSIS	
CERTIFICATE OF ORIGINALITY	33210 10
I certify that this is all my original work:	
Student's name Student's signature	Date
Teacher's name Teacher's signature	Date

ALL ENTRIES MUST BE RECEIVED BY CLOSE OF BUSINESS ON FRIDAY 19th NOVEMBER 2010

Advice to contributors

- 1. *Objective:* The *Geography Bulletin* is the quarterly journal of the New South Wales Geography Teachers' Association, Inc. The role of the *Geography Bulletin* is to disseminate up-to-date geographical information and to widen access to new geographic teaching ideas and methods. Articles of interest to teachers and students of geography in both secondary and tertiary institutions are invited, and contributions of factually correct, informed analyses, and case studies suitable for use in secondary schools are particularly welcomed.
- Content: Articles, not normally exceeding 5000 words (no minimum specification), should be submitted to the Editor at the following address: PO Box 577, Leichhardt, NSW, 2040

Articles are welcomed from tertiary and secondary teachers, students, business and government representatives. Articles may also be solicited from time to time. Articles submitted will be evaluated according to their ability to meet the objectives outlined above.

- 3. *Format:* An original on disk plus one hard copy should be submitted. Tables should be on separate pages, one per page, and figures should be clearly drawn, one per page, in black on opaque paper suitable for photographing. Photographs should be on glossy paper, and strong in contrast. An indication should be given in the text of approximate location of tables, figures and photographs. Every illustration needs a caption.
- 4. *Title:* The title should be short, yet clear and descriptive. The author's name should appear in full, together with a full title of position held and location of employment.
- 5. *Covering Letter:* A covering letter, with return forwarding address should accompany all submitted articles. If the manuscript has been submitted to another journal, this should be stated clearly.
- 6. *Photo of Contributor:* Contributors should enclose a passport-type photograph and a brief biographical statement.
- 7. *References:* References should follow the conventional author-date format:
 - Abbott, B. K. (1980) *The Historical and Geographical Development of Muswellbrook* Newcastle: Hunter Valley Press.
 - Harrison, T. L. (1973a) *Railway to Jugiong* Adelaide: The Rosebud Press. (*2nd Ed.*)
 - Harrison, T. L. (1973b) The Spatial Distribution of Macadamia Plantations on the Far North Coast of New South Wales, *Journal of Rural and Agricultural Problems*, 13, 4, Oct. pp. 347–359.
 - O'Donovan, M. J., *et. al.* (1980) "Animal life in the North Star District of New South Wales".
 In W.W. Murphy, (Ed.) *Readings in Regional Geography (Vol. 2)*, Sydney: Williams and Sons.
- 8. Italics should be indicated by underlining.
- 9. *Spelling* should follow the *Macquarie Dictionary*, and Australian place names should follow the Geographical Place Names Board for the appropriate state.



Photograph courtesy of AusAid. Source: www.flickr.com/photos/ausaid_photolibrary/sets/

Books for review should be sent to:

Mr John Lewis, Review Editor, The GTA NSW Office PO Box 577 Leichhardt NSW 2040

Deadlines for articles and advertising

- Issue 1 1 December
- Issue 2 1 March
- Issue 3 1 May
- Issue 4 1 August

Notice to Advertisers

'Geography Bulletin' welcomes advertisements concerning publications, resources, workshops, etc. relevant to geography education.

FULL PAGE (26 x 18cm) – \$368.50 Special issues \$649.00

- HALF PAGE (18 x 13cm or 26 x 8.5cm) \$214.50 Special Issues \$382.80
- QUARTER PAGE (13 x 8.5cm or 18 x 6.5cm) \$132.00 Special issues \$242.00

INSERTS (A4 supplied) – \$374.00 All prices include GST

Advertising bookings should be directed to:

Carmel Logalbo, GTA NSW Office Telephone: (02) 9564 3322 Fax: (02) 9564 2342 Email: carmel.logalbo@ptc.nsw.edu.au



Benefits of GTA membership

The Geography Teachers' Association of New South Wales (GTA) is a not-for-profit, incorporated body that represents the professional interests of Geography teachers in NSW and Geographical Education more generally. The objectives of the Association are to promote the study and teaching of geography in schools by:

- providing professional learning opportunities for teachers of Geography;
- advocating the interests of Geography teachers on matters in the State and National interest;
- providing forums where teachers of Geography and the wider community can exchange views;
- supporting Geographical Education through the development and dissemination of geographical resources; and
- promoting geographical research and fieldwork.

The GTA seeks to address its objectives via a yearly program of activities and events.

The Geography Bulletin is a quality, peer-reviewed journal printed magazine published by the Association quarterly. It is designed to serve the contemporary interests of Geography teachers and students. The Bulletin aims to provide practical knowledge, skills and resource materials on a regular basis.

The Association traditionally runs a number of Teacher Professional Learning Workshops throughout the year. These workshops include both full-day programs as well as after school opportunities. The workshops are scheduled in a number of regional locations in Newcastle and the Hunter, Wollongong, Canberra, Central Coast as well as metropolitan Sydney. These workshops typically focus on current issues, including in Global Education, the use of technology in the classroom, research and fieldwork skills.

Each year the Association holds its Annual Conference. The conference typically consists of a one-day event with keynote addresses from leading geographers on contemporary and emerging geographical issues as well as more practical sessions by geographical practitioners. These conferences are designed to assist teachers implement changes in Geography syllabuses and to provide teachers with an opportunity to enhance their professional learning by sharing ideas for classroom and fieldwork activities and hearing about current developments in geographical education.

The Association hosts an Annual Fieldwork Award Competition for Geography students in secondary schools. The competition is designed to foster enthusiasm for Geography through engagement and rewards. The emphasis of the competition is field work and the gathering primary data as part of authentic research in geography. Typically the work of between twenty to thirty geography students is acknowledged each year via an award prize. Each year the Association hosts both School Certificate and Higher School Certificate Reviews for teachers of Geography. These reviews are held in a number of regional areas across the state.

The Association, often in conjunction with the Geography Society of NSW, regularly recognises by Public Acclaim the contribution of outstanding geographers to the development of the discipline of Geography. On a regular basis, the Association presents a variety of Professional Awards including The Brock Rowe Award, The Macdonald Holmes Medal, The Geoff Connolly Bulletin Award and Fellowship of the Association.

The Association is active in presenting the interests of Geography teachers in areas of public concern, by investigating and making recommendations to appropriate authorities (including the NSW Board of Studies) on educational policies and other matters of State and National interest in which Geography teachers are involved. This advocacy includes close liaison with the Australian Geography Teachers' Association (AGTA) and the Professional Teachers' Council of NSW (PTC NSW). Currently, the focus of this advocacy is on the development of a National Curriculum for Geography and the professional learning requirements of the NSW Institute of Teachers. A large portion of GTA teacher professional learning is accredited by the Institute via the PTC NSW.

The Association also provides advice and assistance to commercial publishers of print, computer and audio-visual and multi-media materials for use by Geography students.

The Council of the Association is elected annually by members. All positions are honorary, and the Council members are provided with a variety of opportunities to develop a range of managerial and leadership skills. Members are encouraged to nominate for membership of the Council. It provides an outstanding opportunity for service to the profession.

Membership Categories

The Association offers three categories of membership.

Personal Membership provides teachers with access to all the activities and events hosted by the Association at a discounted rate. All personal members receive quarterly copies of the Geography Bulletin and are encouraged to become active in the affairs of the Association by becoming a GTA Councillor. All Personal Members are entitled to vote at meetings of the Association.

Corporate Membership is open to schools and commercial bodies. This provides access to corporations to the Association's prestigious Geography Bulletin.

Concessional Membership is available to teachers and university students not in full-time employment. Concessional Members receive all the benefits of a Personal Member at a discounted rate (however student members are not entitled to hold office or to vote at Association meetings).

For further information – www.gtansw.org.au

EDITORIAL POLICY

Editorial policy attempts to:

- promote material which will assist the study and teaching of geography
- encourage teachers to share their ideas on teaching geography
- provide a means by which teachers can publish articles
- inform readers of developments in geographical education

Articles are sought reflecting research and innovations in teaching practices in schools. From time to time issues of the Bulletin address specific themes.

Refereeing

All suitable manuscripts submitted to the Geography Bulletin are subject to the process of review. The authors and contributors alone are responsible for the opinions expressed in their articles and while reasonable checks are made to ensure the accuracy of all statements, neither the editor nor the Geography Teachers' Association of New South Wales Inc accepts responsibility for statements or opinions expressed herein.

