This book is about designing sustainable human settlements, and preserving and extending natural systems. It covers aspects of designing and maintaining a cultivated ecology in any climate: the principles of design; design methods; understanding patterns in nature; climatic factors; water; soils; earthworks; techniquesandstrategies ni the different climatic types; aquaculture; and thesocial, legal, and economic design of human settlement.
It calls into question not only the current
methods of agriculture but also the very need for a formal food agriculture if wastelands and the excessive lawnculture within towns and cities are devoted to food production and small livestock suited tolocal needs.
The world can no longer sustain the damage caused by modern agriculture, monocultural forestry, and thoughtless settlement design, and ni the near future we will see the end of wasted energy, or the end of civilization as we know it, due to human-caused pollution and climate changes.
Strategies forthe necessary changes in social investment policy, politics itself, and towards regional or village self-reliance are now
desperately needed, and examples of these strategies are given. It is hoped that this manual will open the global debate that must never end, and so givea guide to the form of a future in which our children have at least a chance of a reasonable existence.
PERMACULTURE A Designers' Manual

Born in 1928in thesmall fishing village of Stanley, Tasmania, Bil Mollison left school at the age of 15 to help run the family bakery. He soon went to sea
as a shark fisherman and seaman bringing vessels from post-war disposals to southernports, and until 1954 filled a variety of jobs as a forester, mil- worker, trapper, snarer, tractor-driver, and naturalist.
Billjoined theCSIRO (WIldlife Survey Section) in 1954 and for the next nine years worked in many remote locations in Australia as a biologist, doing field work on rabbits, locusts,muttonbirds, andforest regeneration problems with marsupials. In 1963 he spent ayear at the Tasmania Museum in curatorial duties, then returned to field work with the Inland Fisheries Commission surveying the macrofauna of inland waters and estuaries, recording food chains and water conditions in all the rivers and lagoons of Tasmania.
Returning to studies in 1966, he lived on his wits running cattle, bouncing at dances, shark fishing. and teaching part-time at an exclusive girls' school. Upon receiving his degree i nbio-famaris" where he later ete veol ped the unit fo Environmental Psychology. During his university period (whichlastedfor 10 years), Bifl
independently researched and publisheda three- volume treatise on the history and genealogiesof the descendants of the Tasmanian aborigines. In 1974, he and DavidHolmgren developed and refined the permaculture concept, leading to the fublication fo Permaculture One and Permaculture
Sinceleaving the Unversity in 1978, Bil has devoted all his energies to furthering the system of permacultureand spreading the idea and principles worldwide. He has taught thousands of students, and has contributed many articles, curricula, reports, and recommendations for farm projects, urban clusters,and local government bodies. In 1981, BillMollison received theRight

Livelihood Award (sometimes called the "Alternative Nobel Prize") for his work in environmental design. In recent years, he has established a "Trust in Aid" fund to enable permaculture teachers to reach groups in need, particularly in the poorer parts ofthe world,with the aim of leaving a core of teachers locally to continue appropriate educational work.
Bill Mollison is the Executive Director of the Permaculture Institute, which was established in 1979 to teach the practical design of sustainable soil, water, plant, and legal and economic systems to students worldwide.

PERMACULTURE ADesigners' Manual
by Bill Mollison
illustrated by Andrew Jeeves
manuscript and editing, Reny Mia Slay
TAGARI PUBLICATIONS • TYALGUM AUSTRALIA

A TAGARI PUBLICATION Publishers for the Permaculture Institute since 1979
PERMACULTURE: A Designers' Manual Second edition
156,000 inprint as of September, 2002 © Bill Mollison 1988
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TAGARI PUBLICATIONS
Publishers for the Permaculture Institute since 1979 31 Rulia Rond
Sisters Creek, Tasmania, 7325 Australia www.tagari.com
International phone: 61 3 6445 0945 International fax: 61 3 6445 0944 Email: tagariadmind@southcom.com.au
Manuscript and photographs: Bill Mollison.
Design, illustration, cover and layout. Andrew Jeeves. (Additional illustrations by Jorg Schulze)
Typscript, editing, text arrangement: Reny Mia Slay
National Library of Australia Cataloguing-in-publication
Mollison, Bil.
Permaculture: designers' manual
Includes index.
ISBN 0 908228 01 5
.1 Organic farming. 2 Organic gardening. .I Jeeves, Andrew, 1956 -
LI. Slay, Reny Mia, 1953 - . I. Title.
631.5'84
Printed in Australia by: McPherson's Printing Group, Maryborough, Victoria 3465

CONTENTS

graduates of a Permaculture Institute can teach
December

August
used in figures to indicate the sun direction rather than
gives news of events, publishes a directory of
evolutions.
The word "permaculture" can be used by anybody adhering to the ethics and principles expressed herein, The only restriction on use is that of teaching: only "permaculture", and they adhere to agreed-on curricula developed by hte Colege of Graduates of the Institutes of Permaculture.
CONVENTIONS USED
References and Abbreviations: Minor references are given ni the text, and those usefulto chapter contents only are located at the close of those chapters. Key references are assembled at the close of thebook, and
are superscripted as numbers in the text.
Seasons and Directions: So that the text and figures are useful and readable in both hemispheres, I have used the words "sun-side" or "sunwards', and "shade side" or "polewards" rather than south and north, and
converted months to seasons as below:
Used Northern Southern Here Hemisphere. Hemisphere
ACCESS TO INFORMATION
Material ni this work can be fairly easily accessed in these ways: chapter and section contents are listed in the Table of Contents. Main subjects are listed in the Index. There is a list of the commonand Latinnames of
plants used in the text located in the Appendix. Also located in the Appendix si a glossaryof terms used; some few words are recently coined or (like "permacul- ture") are t h econceit of the author.
To forestall needless correspondence, subscription to the International Permaculture Journal (113 Enmore Rd, Enmore, NSW 2042, Australia) gives information on permaculture themes, reviews recent publications,
permaculture centres, and has a host of other useful data. Further resources are also listed in the Appendix.
Summer early June mid
July late
January February
March April May
June July
August
September October November
A u t u m n
Winter
Spring
early
September mid
October
late November

early December mid January late February
early March mid April late
May
These may be further refined by the useof "first week af. For the same reason, the symbol below si
the north or south symbol:
One hopes this prevents the problem of al those good North Americans wandering on the north tace of their hills, looking for the sun, poised dangerously upside-down on the Earth as they are.

The great oval of the design represents the egg of life; that quantity of life which cannot be created or des- troyed, but from within which all things that live are expressed. Within the egg si coiled the rainbow snake, the Earth-shaper of Australian and American aboriginal peoples.
"We have a legend that explains the forma- tion of the hills. the rivers, and all the shapes of the land. Everytime it rains and I sce a beautiful rainbow I am reminded of the legend of the the Rainbow Serpent...
In the beginning the earth was flat, a vast grey plain. As the Rainbow Serpent wound his way across the land, the movement of his body heaped up the mountains and dug troughs for the rivers. with each thrust of his huge multi- coloured body a new land form was created.
At last. tired with the effort of shaping the earth, he crawled into a waterhole. The cool water washed over his vast body, cooling and soothing him. Each time the animals visited
the waterhole, they were careful not to disturb the Rainbow Serpent, for although they could not see him they knew he was there. Then one day, after a huge rainstorm, they saw him, His huge coloured body was arching from the waterhole. over the tree tops, up through the clouds, across the plain to another waterhole. To this day the Aborigines are careful not to disturb the Rainbow Serpent, as they see him. going across the sky from one waterhole to another."
(From Gulpilil's, Stories of the Dreamtime compiled by Hugh Rule and Stuart Goodman, published by Wiliam Collins,Sydney, 1979,)
Within the body of the Rainbow Serpent is contained the tree of life, which itself expresses the general pattern of life forms, sa further elaborated ni the chapter on pattern in this book. Its roots are in earth, and its crown in rain, sunlight and wind. Elemental forces and flows shown external to the oval represent the physical environment, the sun, and the matter of the universe; the materials from which life on earth is formed. The whole cycle and form si dedicated, as is this book, to the complexity fo life on Earth.
COVER STORY

1.1
PERMACULTURE DESIGN PHILOSOPHY
Although this book si about design, it is also about values and ethics, and above all about a sense of peronal responsibility for earth care. I have written at times in the first person, ot indicate that it si not a detached, impersonal, or even unbiased document. Every book or publication has an author, and what that author chooses to write about si subjective, for that person alone determines the subject, content, and the values expressed or omitted. I am not

detached from, but have been passionately involved with this earth, and so herein give a brief vision of what I think can be achieved by anyone

The sad reality is that we are ni danger of perishing from our own stupidity and lack of personal responsibility ot life. If we become extinct becauseof factors beyond our control, then we can at least die with pride in ourselves, but to create a mess in which we perish by our own inaction makes nonsense of our claims to consciousness and morality.

There is too much contemporary evidence of ecological disaster which appals me, and it should frighten you, too. Our consumptive lifestyle has led us to the very brink of annihilation. We have expanded our right to live on the earth to an entitlement to conquer the earth, yet "conquerors" of nature always lose. To accumulate wealth, power, or land beyond one's needs in a limited world si to be truly immoral, be it as an individual, an institution,or a nation-state.

it is to fight during times of natural disasters, when everyone's cooperation is vital.

A person of courage today is a person of peace. The courage we need si to refuse authority and to accept only personally responsible decisions. Like war, growth at any cost is an outmoded and discredited concept. It is our lives which are being laid to waste. What is worse, it is our children's world which is being destroyed. It si therefore our only possible decision to withhold all support for destructive systems, and to cease to invest our lives in our own annihilation.

ThePrimeDirectiveo fPermaculture.

The only ethical decision is to take responsibility for our own existence and that of our children, Make it now.

Most thinking people would agree that we have arrived at final and irrevocable decisions that will

abolish or sustain life on this earth. We can either ignore the madness of uncontrolled industrial growth and defence spending that si ni smallbites, or large catastrophes, eroding life forms every day or take the path to life and survival.

Information and humanity, science and understanding are in transition. Long ago, we began by wondering mainly about what si most distant; astronomy and astrology were our ancient pre-occupations. We progressed, millenia by millenia, to enumerating the wonders of earth. First by naming things, then by categorising them, and more recently by deciding how they function and what work they do within and without themselves. This analysis has

resulted in the development of different sciences, disciplines and technologies: a welter of names and the sundering of parts; a proliferation of specialists; and a consequent inability to foresee results or to design integrated systems.

The present great shift in emphasis is on how the parts interact, how they work together with each other,

What we have done, we can undo. There is nolonger time to waste nor any need to accumulate more evidence of disasters; the time for action is here. I deeply believe that people are the only critical resource needed by people. We ourseives, if we organise our talents, are sufficient to each other. What is more, we will either survive together, or none of us will survive. To fight between ourselves si as stupid and wasteful as

Chapter 1 INTRODUCTION

woh dissonance or harmony ni life systems or society si achieved. Life iscooperative rather than competitive, and life forms of very different qualities mayinteract beneficially wit

h one another and with their
physical enviro
nment. Even
"the bacteria...
live
by
collaboration, accommodation, exchange, and barter (Lewis Thomas, 19741.
Principle of Cooperation.
Cooperation, not competition, is the very basis of existing life systems and of future survival. There are many opportunities ot create systems that work from the elements and technologies that exist. Perhaps we should do nothing else for the next century but apply our knowledge. We already know how to build
, maintain, and inhabit sustainable systems. Every essential problem si solved, but in the everyday life of people this si hardly apparent. The wage-slave, peasant, landlord, and industrialist alike are deprived of the leisure and
the life spirit that is possible in a cooperative society which applies its knowledge. Both warders and prisoners are equally captive ni the societyin which we live.
if we question why we are here and what life is, then we leadourselves into both science and mysticism which are coming closer together as science itself approaches its conceptual limits. As for life, it is the most open of open systems, able to take from the energy resourcesin time and to re-express itself not only as a lifetime but as a descent and an evolution.
which al return. The ideal way ni which ot spend one's time is intheperfection of the expression of life, to lead the most evolved life possible, and to assist in and celebrate the existence
of life fo
rms other than humans,
for all com
e fromthe same egg.
The totality of this outlook leads to a meaningful daily existence, in which one sees each quantumof life eternally trying to perfect an expression towards a future, and possibly transcendental, perfection. It is all the more horrific, therefore, that tribal peoples, whose aim was to develop a conceptual and spiritual existence, have encountered a crude scientific and material culture whose life aim si not only unstated,
but which relies on pseudo-economic and techno- logical systems for its existence.
Lovelock (1979) has perhaps best expressed a philosophy, or insight, which links scienceand tribal beliefs: he sees the earth, and the universe, as athought process, or as a self-regulating self-constructed and reactive system, creating and preserving the conditions that make life possible, and actively adjusting to regulate disturbances. Humanity however, in its present mindlessness, may be the one disturbance that the earth cannot tolerate.
The Gala hypothests is for those who like to walk or simply stand and stare, to wonder aboutthe earth and the life it bears, and to speculate about the consequences of our own presence here. It is an alternative to that
pessimistic view which sees nature as a primitive force to be subdued and conquered. It is also an alternative to that equally depressing picture of our planet as a

demented spaceship. forever travelling. driverless and purposeless, around an inner circle of the sun.
(.E. Lovelock, 1979).
For every scientific statement articulated on energy, the Aborigin
al tribes
people
of
Australia have
an enquivalent statement on life. Life, they samy, si a totality either created nor destroyed. It can be i agined as an egg from which all tribes (life forms) issue and to
1 . 2 ETHICS
In earlier days, several of us researched community ethics, as adopted by older religious and cooperative groups, secking for universal principles to guide our own actions. Although many of these guidelines contained as many as 18 principles, most of these can be included ni the three below and even the second and third arise from the first).
TheEthical Basis of Permaculture
1, CARE OF THE EARTH: Provision for al life systems ot continueandmultiply.
2. CARE OF PEOnPLE: Provision for people to access tho
se re
sourc
es
ece
ssary
to their existence. 3.SETTING LIMITS TO POPULATION AnND CONSUMPTION: By governing our own eeds, we can set resoufces aside tofurther the above principles.
2
The experience of the natural world and its laws has almost been ab
andoned for closed, artificial, and meaningless lives, perhaps best typified by the dreams of those who would live in space satellites and abandon a dying earth.
I believe that unless we adopt sophisticated aboriginal belief systems and learn respect for all life, then we lose our own, not only as lifetime but also as any future opportunity to evolve our potential. Whether we continue, without an ethic or a philo- sophy, like abandoned and orphaned children, or whether we create opportunities to achieve maturity, balance, and harmony si the only real question that faces hte present generation. This si the debate that must never stop.
A young woman once came to me after a lecture in which I wondered at the various concepts of afterlife; the plethora of heavens" ofered yb variousgroups. Her view was, This si heaven, right here. This is it. Gite ital you be go".t
I couldn't better that advice. The heaven, or hel, we live in si ofour own making. An afterlife, fi such exists, can be no different for each of us.

This ethic is a very simple statement of guidance, and serves wel ot illuminate everyday endeavours. tI can be coupled to a determination ot make our own way:

to be neither employers nor employees, landlords nor tenants, but to be self-reliant as individuals and to cooperate as groups.

For the sake of the earth itself, I evolved a philosophy close to Taoism from my experiences with natural systems. As it was stated in Permaculture Tue, it is a philosophy of working with rather than against nature; of protracted and thoughtful observation rather than protracted and thoughtless action; of looking at systems and people in all their functions, rather than asking only one yield of them; and of allowing systems to demonstrate their own evolutions. Abasic question that can be asked intwo ways is: "Whatcan Iget from this land, or person?" or "What does this person, or land, have to give fi I cooperate withthem?*

Of these two approaches, the former leads to war and waste, the latter to peace and plenty. Most conflicts, I find, lay in how such questions are asked, and not in the answers to any question. Or, to put it another way, we are clearly looking for the right questions rather than for answers. We should be alert to rephrase or refusethe "wrong* question.

It has become evident that unity in people comes from a common adherence to a set of ethical principles, each of us perhaps going our own way, at our own pace, and within the limits of our resources, yet all leading to the same goals, which in our own case is that of a living complex, and sustainable earth. Those who agree on such ethics, philosophies, and goals form a global nation.

Thoroughly replace lost minerals;

* Do acareful energy accounting and

• Make an assessment of the long-term, negative,

biosocial ettects on society, and act to buffer or eliminate these.

In practice, we evolve over time to various forms of accounting for our actions. Such accounts are fiscal, social, environmental, aesthetic, or energetic in nature,

and all are appropriate to our own survival. Consideration of these rules of necessitous and conservative use may lead us, step by step, to the basic realisation of our interconnectedness with nature; that we depend on good health in all systems for our survival. Thus, we widen the self-interested idea of human survival (on the basis of past famine and environmental disaster) to include the idea of "the

survival of natural systems", and can see, for example, that when we lose plant and animal species due to our actions, we lose many survival opportunities. Our fates are intertwined. This process, or something like it, si common to every group of people who evolve a general earthcare ethic.

Having developed an earthcare ethic by assessing our best course for survival, we then turn to our relationships with others. Here, we observe a general rule of nature: that cooperative species andassocia- tions of self-supporting species (like mycorrhiza on tree roots) make healthy communities. Such lessons lead us to a sensible resolve to cooperate and take support roles in society, to foster an interdependence which values the individual's contributions rather than

How do a people evolve an ethic, and why should we bother to do so?

Humans are thinking beings, with long memories, oral and written records, and the ability to investigate the distant past by applying a variety of techniques from dendrochronology to archaeology, pollen analy- sis to the geological sciences. tI si therefore evident that behaviours

in the natural world which we thought appropriate at one time later prove to be damaging to our own society in the long-term leg, the effects of biocidal pest controls on soils and water).
Thus, we are led by information, reflection, and careful investigation to moderate, abandon, or forbid certain behaviours and substances that in the long- term threaten our own survival; we act tosuribe. Conservative and cautious rules of behaviour are evolved. This is a rational and sensible process,
responsible for many taboos in tribal societies.
From a great many case histories we can list some rules of use, for example the RULE OF NECESSITOUS USE that we leave any natural system alone until we are, of strict necessity, forced to use it. We may then follow up with RULES OF CONSERVATIVE USE--having found it necessary to use anatural resource, we may insiston every attempt to
Reduce waste, hence pollution,
forms of opposition or competition.
Although initially we can see how helping our family and friends assists us in our own survival, we may evolve themature ethic that sees all humankind as family, and al life sa allied associations. Thus, we expand prople care to speciescare, for al life has common origins. Al are "our family".
We see how enlightened self-interest leads us to evolve ethics of sustainable and sensible behaviour. These then, are the ethics expressed in permaculture.
Having evolved ethics, we can then devise tays to apply them to our lives, economies, gardens, land, and nature. This is what this book is about the mechan-
isms of mature ethical behaviour, or how to act to sustain the earth.
There is more than one way to achieve permanence
and stability in landor society. The peasant approach si wel described by King() for old China. Here people hauled nutrients from canals, cesspits, pathways and forests ot an annual grain culture. We could describe this as "feudal permanence" for its methods, period and politics. People were bound to the landscape by
unremitting toil, and in service to a state or landlord. This leads eventually to famine and revolution.
A second approach is on permanent pasture of prairie, pampas, and modern western farms, where large holdings and few people create vast grazing leases, usually for a single species of animal. This is best described as "baronial permanence" with [Continued on page 6...) 3

bear-regal properties of immense extent, working at eht lowest possible level of land use (pasture or cropland si the least productive use of land we can devisel. Such systems, once mechanised, destroy whole landscapes and soil complexes. They can then best be typified as agricultural deserts.
Forests, not seen by industrial man as anything but wood, are another permanent agriculture. But they need generations of care and knowledge, and hence a tribal or communal reverence only found in stable communities. This then, si the communal permanence many of us sek: ot

be able ot plant a pecan or citrus when we are old, and to know it will not be out down by our children's children.

The further we depart from communal permanence,
the greater the risk of tyranny, feudalism, and revolution and the more work for less yield. Any error
or disturbance can then bring disaster, as can a drought year in a desert grain crop or a distant political decision on tariffs.

The real risk is that the needs of those people working "on the ground", the inhabitants, are overthrown by the needs (or greeds) of commerce and centralised power, that the forest is cut for warships or newspaper and we are reduced to serfs in a barren landscape.This has been the fate of peasant Europe, Ireland, and much of the third world.

The characteristic that typifies all permanent agricultures si that the needs of thesystem for energy
are provided by that system. Modern crop agriculture si totally dependent on external energies-hence the oil problem and its associated pollution.

Figure 1.1 is a very simple but sufficient illustration of thecase Ima making. Selected forests not only yield more than annual crops, but provide adiverse nutrient and fuel resource for such crops.

Without permanent agriculture there si no possibility of a stable social order. Thus, the move from pro- ductive permanent systems (where the land si held
from a low- to a high-energy society, the use of land ni an exploitative way, and a demand for external energy resources, mainly provided by the third world. People think 1am slightly crazy when Itel them ot go home and garden, or not to involve themselves in broadscale mechanised agriculture; but a little thought and reading wil convince them that this is, ni fact, the solution to many world problems.

What si now possible si atotaly new synthesis of plant and animal systems, using a post-industrial or even computerised approach to system design,
applying the principles of whole-system energy flows as devised by Odum (1971), and the principles of ecology as enunciated by Wattan and others. tI is, in the vernacular, a whole new ball game to devise permaculture systems for local, regional, and personal needs.

Had we taught this approach from the beginning, we would al be in a stable and functional landscape, but our grandparents failed us, and (perhaps for lack of time or information) set up the present, and continuing. mis-designed households, towns, and cities. The concept of "free energy put the final nail ni the coffin of commonsense community, and enabled materialistic societies ot rob distant peoples, oblivious of the inevitable accounting to come.

1.3 PERMACULTURE IN LANDSCAPE AND SOCIETY

As the basis of permaculture is beneficial design, it can be added ot al other ethical training and skils, and has the potential of taking a place in all human
endeavours. In the broad landscape, however, permaculture concentrates on already-settled areas and agricultural lands. Almostall of these need drastic rehabilitation and re-thinking. One certain result of using our skills to integrate food supply and

NI Conservation Accounting;
Life Form Richoess.

Bard Genetic richness ni crops and ivestock
Bar9. Soil life (biomass).
Bat 10. Forest biomass and wildite richness.
Bacil: Los ot pests.
V Social Accounting
Bat 12 Employment on farm (human design and/or shols replace mostmachine systems)
Bar 13 Food quality produced.
Bar 14 Human and environmentalhealth
Bar 15: Life quality, as right livelihood
Thus, I can be seen that a transition from contempory western agriculturet oconservationfarming and permaculture has most benefitsforpeopleandtoother ife forms: farming can become energy productive, and farms can peoduce real income without pudac subsidy. ni particular fi farm products are already matched ot local or regional demand.
ni common), to annual, commercial agricultures where land is regarded as acommodity, involves a departure
I
. FIGURE 11. CAPTION CONTINUEDI
Bar .2 Cost of producing that income ni real terms (excess cost over income represents subsidies. Note that any farm "profits* are achieved by subsidy, the doßar costs do not balance unbi organic tarming si achieved. Fmar
income si actileved by reducing production costs).
I Energy Accounting.
Bar3 . Oil for calories)
sa machinery,
fuels,
fertilisers,
biocides Starts ta 101 against (los) in conventional farming, andcan reach a 1:120 gain ni conservation farming/permaculture with firewood and fuels.
Bar.4: Energy produced on farm; includes fuel oits from crop. firewood, calories ni food produced (solar energy si a constant, but it contributesmost energy inconservation farming/permaculture)
lll Environmeetal Accounting.
Bac5: Seil los; includes humus loss and mineral nutrient los.
Bar6: Efficiency of water use and soil water storage.
Bart: Pollution peoduced (posoning of atmosphere, soils, water) by fuels, biocides, and fertilisers. Soils are created inconservation tarringpermacu ture, water conserved, and poilutants removed,

settlement, to catch water from our roof areas, and to place nearby a zone of fuel forest which receives wastesand supplies energy, will be to free most of the area of the globe for the rehabilitation of natural systems. These need never be looked upon as of use to people", except in the very broad sense of global health.
The real difference between a cultivated (designed)
ecosystem, and a natural system is that the great

majority of species (and biomass) in the cultivated ecology si intended for the use of humans or their livestock. We are only a small part of the total primeval
or natural species assembly, and only a small part of its yields are directly available to us. But in our own
gardens, almost every plant si selected to provide or support some direct yield for people. Household design relates principally to the needs of people; it is thus human-centred (anthropocentric).
This is a valid aim for settlement design, but we also need a nature-centred ethic for wilderness con- servation. We cannot, however, do much for nature
fi we do not govern our greed, and fi we do not supply our needs from our existing settlements. If we can achieve this aim, we can withdraw from much of the
agricultural landscape, and alow natural systems to flourish.
Recycling of nutrients and energy in nature is a
function of many species. nI our gardens, ti si our own
responsibility ot return wastes (via compost ormulch?
to the soil and plants. We actively create soil in our
gardens, whereas in nature many other species carry out that function. Around our homes we can catch
water for garden use, but we rely on natural forested landscapes to provide the condenser leaves and clouds to keep rivers running with clean water, to maintain the global atmosphere, and to lock up our gaseous pollutants. Thus, even anthropocentric people would be
weil-advised to pay close attention to, and to assist in, the conservation of existing forests and the rehabilitation of degraded lands. Our own survival demands that we preserve al existing species, and allow them a place to live.
We have abused the land and laid waste to systems we need never have disturbed had we attended to our home gardens and settlements. If we needto state a set of ethics onnatural systems, then let it be thus:
• Implacable and uncompromising opposition to further disturbance of any remaining natural forests, where most species are still in balance;
• Vigorous rehabilitation of degraded and damaged natural systems to stable states;
• Establishment of plant systems for our own use on the Irast amount of land we can use for our existence, and
•Establishment of plant and animal refuges for rare orthreatened species.
Permaculture as a design system deals primarily with t h e third statement above, but all people who act responsibly ni fact subscribe to thefirst and second statements. That said, Ibelieve we should use al the
species we need or can find to use in our own settlement designs, providing they are not locally nampant and invasipe.
Whether we approve of it or not, the world about us continually changes. Some would want to keep everything the same, but history. palacontology, and commonsense tells us that all has changed, is changing. will change. In a world where we are losing forests, species, and whole ecosystems, there are three concurrent and parallel responses to the environment: .1 CARE FOR SURVIVING NATURAL ASSEMBL-
lES, to leave the wilderness ot heal itself.

2. REHABILITATE DEGRADED OR ERODED
LAND using complex pioneer species and long-term plant assemblies (trees, shrubs, ground covers).
.3 CREATE OUR OWN COMPLEX LIVING ENVIRONMENT with as many species as we can save, or have need for, from wherever on earth they come, We are fast approaching the point where we need refuges for all global life forms, as weil as regional, national, or state parks for indigenous forms of plants and animals. While we see our local flora and fauna as "native, we may also logically see al life as "native to earth'. While we try to preserve systems that are still local and diverse, we should also build new or recombinant ecologies from giobal resources, especiaily ni order ot stabilisedegraded lands.
nI your own garden, there are likely ot be plants, animals, and soil organisms from every major landmass and many islands. Jet travel has merely
accelerated a process already well-established by continental drift, bird migration, wind transport, and the rafting of debris by water, Everything wil, intime, either become extinct, spread more widely, or evolve to new forms. Each of these processes is happening at
once, but the rate of extinction and exchange is accelerating. Rather than new species, adapted hybrids are arising for example as palms, sea grasses, and snails, and micro-organisms from many continents meet, mix, and produce new accommodations to their new" environments.
The very chemistry of the ait, soil, and water si ni flux. Metals, chemicals, isotopes, gases, and plastics are loose on earth that have never before been present, or never present in such form and quantity before we made it so
It is my belief that we have two responsibilities to
pursue:
• Primarily, it si to get our house and garden, our place of living, ni order, so that it supports us.
Secondarily, it si to limit our population on earth, or weourselves become the finalplague.
Both these duties are intimately connected, as stable
regions create stable populations. fI we do not getour cities, homes, and gardens in order, so that they feed and shelter us, we must lay waste to allother natural systems. Thus,truly responsibleconservationists have gardens which support their food needs, and are working ot reduce their own energy needs to amodest consumption, or to that which can be supplied by local

TABLE 1.1 PERMACULTURE DESIGN
The result of a unique asseroly of constructs, species, and social systems into a unique catter suited to a speciticsiteand set of occupants
ORGANIC PROCESS ELEMENTS
INORGANIC AND DERIVED ORGANIC ELEMENTS
Materials and Fuels
SOCIO-LEGAL ELEMENTS
Legal/Financial Structures
SELECTION
ASSEMBLY
SITE

SPECIFIC CONSIDERATIONS
ELEMENTAL
[FLOW) CONTROL
FEED BACK
Species People
Guilds Commun
Earth-shaping
1 Technology Constructs Trusts, Companies, Cooperatives, Community Credit Unions.
Water Supply
Planting patterns
PATTERNING
For best flow, function, and yield whilst conserving resources.
YIELD AND FUNCTION
A marriage of site constraints to people's needs.
* TOTALDESIGN I NEVOLUTION
T OMATURITY.
OBSERVATION, EVALUATION, AND CONTROL

wind, water, forest, or solar power resources. We can work on providing biomass for our essential energy needs on a household and regional scale.
i t si hypocrisy ot pretend to save forests, yet to buy daily newspapers and packaged food; to preserve native plants, yet rely on agrochemical production for food; and to adopt a diet which calls for broadscale food production.
Philosopher-gardeners, or farmer-poets, are distinguished by their sense of wonder and real feeling for the environment. When religions cease to obliterate trees ni order to build temples or human artefacts, and instead generalise love and respect to al living systems
CELE conditions, now and for thefuture.
In permaculture, this means that ail of us have some part in identifying, supporting, recommending. investing in, orcreating wilderness habitats and species refuges. the practical way to proceed outside the home garden) si to form or subscribe to institutes or organisationswhose aims under their legal charter are to carry out conservation activities. While the costs are low, ni sum total the effects are profound. Even the smallest garden can reserve of a few square metres of insect, lizard, frog, or butterfly habitat, while larger gardens and farms can fence off forest and wetland areas of critical value to local species. Such areas
1.4
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should be only for the conservation of local species. Permaculture as a design system contains nothing new. It arranges what was always there in a different way, so that it works to conserve energy or togenerate more energy than it consumes. What is novel, and often overlooked, is that any system of total common

difficult subject of patterning, and have tried to order some complex subjects so as to make them accessible. The text is positivistie, without either the pretended innocence or the belief that everything will turn out right. Only fi we make it so wil this happen.

As wil be clear in other chapters of this book, the end result of the adoption of permaculture strategies in any country or region will be to dramatically reduce the area of the agricultural environment needed bythe households and the settlements of people, and to release much of the landscape for the sole use of wildlife and for re-occupation by endemic flora. Respect for al life forms si a basic, and ni fact essential,

ethic for all people.