Why Salt?

Harry Whittington, OAM
and WISALTS:
Community Science in Action

SALLY PAULIN
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For Lal, John, Alison, Sue, Bobby and Jan
In memory of Harry

For Jean, Tim and Andrew
Tony, Jessica and Samuel
In memory of Malcolm

Both strong, good men who gave everything
for what they believed in.
Foreword

‘Salinity’ is an emotive term which has come to represent in many people’s minds the damage that farmers have done to the bush as a result of their clearing and agricultural activities. In reality, this is not such a straightforward explanation. Although it is true, farmers did clear the land, which eventually caused salt scalds to form and land to die, the state government and its agencies must also be considered a major proponent in the equation. Government policies with regard to clearing requirements and creating farms in fragile environments, and their subsequent inability to find ‘the’ solution is a matter of record.

This book examines the way Harry Whittington found a solution to his own land degradation problems at Springhill, Brookton and the formation of WISALTS (Whittington Interceptor Salt Affected Land Treatment Society) who promote his technology – Whittington Interceptor Banks. The banks are designed to capture rainwater where it falls by controlling surface and sub-surface throughflows, so that moisture can be utilised throughout the soil profile, thus preventing waterlogging and dead soil in valley floors.

Whittington was a true community scientist in that he researched all available literature to find solutions and then carried out major experimentation on his property to prove the veracity of his claims. Once satisfied, he promoted his solution and the cause of sustainable agriculture, soil and water conservation to whoever would listen to him — and many did - much to the ire of some politicians and government officials. He has been credited as the “Father of Landcare in Western Australia”

As a result, the Harry Whittington story is necessarily a political one and this is unashamedly the story from his point of view.

I would like to acknowledge and thank the Whittington Family who have given me access to Harry’s papers, good advice and, importantly, have provided the impetus for this book to be published.

Thanks must also go to Arthur Conacher and to the many WISALTS people that gave freely of their time and wonderful country hospitality to tell me about their experiences with Whittington Interceptor Banks — Pam and Jim McGregor of Kojonup, Gavin and Sheila Drew of Gingin, Lloyd Richards of Geraldton, Laurie and Pat Adamson of Quairading, Brian Whittington, Lynn Messenger and the Brookton crew — Noel and Margaret Powell, Suzanne and Darrell Turner and Lance and Erin Turner. There are many others who have not been individually mentioned in this book but who have made important contributions to WISALTS and its work over the years. All these people are truly remarkable in that they continue to persevere with Harry’s work, convinced that they are making a difference to some of the worst problems faced by farmers in Western Australia.

Sally Paulin
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# Table of Contents

Acknowledgements ii

Foreword iii

Table of Contents iv

1. Why Salt? 1

2. Conservation must be our concern 5

3. Community Science 13

4. Harry Whittington, Community Scientist 19

5. Whittington Interceptor Salt Affected Land Treatment Society 31

6. The Consequences 45

7. Conclusions 57

8. References 61
Chapter 1: Why Salt?

'Salinity' is an emotive term, which has come to haunt our vocabulary in recent years. It describes the gradual degradation of our land to a state where very little can be grown on it and, in many cases, huge tracts of land have been consigned to the 'never to be usefully used again' category.

Australian farmers have been portrayed as land clearers who created the problem in the first place with their insatiable hunger for arable land and disregard for the value of saving trees. This was especially evident in the Wheatbelt, where large-scale wheat farming required vast acres of cleared land to enable 'efficient' production methods, including the use of massive combine harvesters. Extra land was also needed to achieve economic yields given the relatively poor soils which farmers encountered.

It is often forgotten that the governments of the day encouraged developmentalism and, in fact, required land clearing as a condition of leases. This was a period of great expansion and the creation of Western Australia as a resource rich state. However, as has been evidenced in the forests and on the farms, the environment is a very delicate organism, which requires special care to maintain it in a healthy and productive state.

In recent times, the rural sector has been hit with devastating droughts and low prices. Many farmers have been forced off their land by bankruptcy and the remainder are fiercely protective of their farms and their lifestyles. They walk a very narrow path between enjoying the benefits of a good season, which tempts some into ill-advised expansion and the dangers of not putting money aside to cope with the 'dry' days.

Those whose land is worst affected could be easily described as bad managers of their land, but in fact it is rarely solely of their own doing. It is clear that some solutions implemented in isolation may solve an individual's problems, but may also create problems for others in the catchment area. It may be a good solution to drain the excess water runoff from your pastures into a stream or drainage channel, thereby reducing the waterlogging problem on your land. However, if all efforts have not been made to reduce the saline and chemical content of that water prior to it reaching the watercourse, there may be cumulative problems downstream.

Where fertiliser and pesticide are not retained in the soil and are washed downslope, it can become a major contributor to imbalances of soil animals and fertility, as well as causing algal and other pollution problems when they run off into watercourses. This was illustrated when the Swan River was 'closed' in 2000 after heavy rains combined with warm temperatures, to produce a toxic algal bloom. The economic damage of these practises also needs to be examined in terms of the constant drain on farmers' pockets as they lose large quantities of 'super' to the rivers.

The whole question of apportioning blame is a dangerous process and inevitably those with louder voices condemn those who can least defend themselves. What is clear is that the 'salinity problem' is a whole community problem—one that whole communities will have to address. Urban dwellers are not exempt from this responsibility. To some extent, ignorance of the salinity problem on the part of urban dwellers could be blamed on the 'out of sight, out of mind' phenomenon with only a small proportion of such people actually seeing the problem and recognising it for what it is. In addition, there exists an 'us and them' mentality between the city and the bush which, although lamentable given the economic benefits which rural people have achieved for the economy of the state, can be put into perspective when you realise that 72 per cent of Western Australia's population live within the metropolitan area. A large proportion of urban dwellers are migrants who have had little connection with agriculture and have come from countries where farming is reasonably sustainable and is assisted by government quotas and regulations.
In a 1975 survey ‘Public attitudes to the environment’ commissioned by the Department of Environment, a preliminary survey carried out in Sydney and Melbourne found that

“public knowledge of what makes the environment tick, how pollution is caused and why it happens is very limited. Despite a far-ranging but merely verbal concern for the state of the environment, there is little technical knowledge about why things are like they are. And most people cannot connect the effect of their own lifestyle with the environment in any way” (Spectrum, 1975).

The report went on to say that the main source of information about the environment for most people was the media and they were not aware of various environmental groups or even the existence of a Federal Department of the Environment either through lack of publicity or they “are not motivated to do anything except express a token interest” (Spectrum, 1975).

The survey found that knowledge of the existence of federal government environmental legislation was very small even amongst public servants who worked in the area; “for them it’s just another job” (Spectrum, 1975).

The most environmentally aware section of the population in this survey, and probably still today, were children who in turn influenced their parents. Even so, the report suggests “it is probable, however, that their sensitivity is more learnt, or even aped, than based on any real understanding of the environment” (Spectrum, 1975).

It is time that ‘salinity’ became fashionable. The environmentalists successfully raised awareness of what was happening in the forests in Western Australia by mastering the publicity machines and attracting high profile urban supporters who were keen to preserve the forests ‘for their children’. They have achieved much and it is hoped that some of these communication skills can be applied to the salinity problem just as effectively. However, the cynical would qualify this success by suggesting that it was the ‘coming out’ of many high profile coalition voters in defence of the forests that forced a vote-conscious Western Australian coalition government to amend its stance somewhat.

‘Salinity’ has become a coverall for many problems affecting farmers and rural landholders. It is true that there are large areas which have become saline and the figures quoted for loss of arable land due to this creeping white death in Western Australia alone were 1.8 million hectares in 1998, and estimated to rise to about 3.3 million hectares in 2020. Good
quality drinking water is becoming scarcer and some
major waterways are too saline to be potable. A
recent paper published by the Australian
Greenhouse Office (Creighton 1999) suggests that
"of the State's divertible water resources, 36 per
cent is brackish or saline and a further 16 per cent is
of marginal quality". But the reasons for this and
other problems affecting agriculturalists, such as
erosion and soil acidity, are not always clearly
understood and there have been many differences
of opinion on how to solve them. It should also be
noted that these figures are only estimates of land
lost to salinity and do not include land which is on
the cusp of being lost, of which there is a very great
deal (B Whittington, 2000).

Over recent years the issue of salinity has become
more public and one that concerns politicians as well
as those who live on the land. However, of the many
solutions that have been put forward, there has been
no one definitive solution agreed upon by all those
concerned whether scientists, politicians or farmers.
For many years, farmers were advised just to fence
off the salt scalds as there was no solution but instead
of containing the problem, the saline areas simply
grew bigger.

One solution put forward by scientists has been to
plant trees in affected areas and this has been seized
on by government agencies as something tangible
that can be implemented easily. It is 'green',
therefore electorally popular, and is also good for
combating greenhouse gas emissions! This initiative
has been implemented through federally funding
Landcare Groups and individual farmers to carry
out tree planting projects. The success of such
projects is difficult to measure and whilst many may
have indeed made some appreciable difference to
the immediate local environment, there are many that
have not achieved the same, if any, results. From
personal communications with farmers, some
volunteered the opinion that farmers would be happy
to take the money and plant the trees but that, unless
environmentally aware, they would not maintain the
fencing and prevent stock invasions once the funds
had dried up.

This is a cynical view of farmers in general. There
are indeed many who are struggling very hard to get
a living from their land and who may be unable to
invest in improving their land without government
sponsored programmes or subsidies. When these
are not forthcoming, the land will gradually worsen
to the point where farms are not viable and farmers
have to 'walk off'.

Agriculture WA (the Department) plays a key role
in advising farmers as to the best way to manage
their land and many farmers follow their line,
eschewing other solutions as unproven and
unscientific. Officially promulgated solutions are
more likely to be given credence, even though
farmers may not understand the science, compared
to another solution that does not have official
support. This has been the case even though
demonstrable results have been achieved in
controlling waterlogging and ultimately reclaiming
dead land (B Whittington, 2000).

One such 'unproved' solution is the Whittington
Interceptor Bank system pioneered by Harry
Whittington OAM, a Brookton farmer, and
promoted throughout Australia by the Whittington
Interceptor Sustainable Agriculture Land Treatment
Society Inc (WISALTS). WISALTS members are
farmers who, having tried the solutions suggested
by Agriculture WA for combating waterlogging and
salinity on their properties with little or no success,
turned to Whittington Interceptor Banks. They have
achieved great success in reclaiming salt affected
and waterlogged land and dramatically increasing
crop yields on previously degraded lands on a regular
basis.

This book sets out the history of Harry Whittington's
Interceptor Bank technology. Chapter 2 looks at
how our way of relating to the land has to change,
from the effects of developmentalism to the need
for a more ecocentric relationship.

In keeping with this ecocentric view, Chapter 3
examines the development of community science—
science initiated and practised by the community,
drawing on expert advice when necessary to
develop solutions to everyday problems.

Chapter 4 draws heavily from Harry Whittington's
own publication, "A Battle for Survival Against Salt
Encroachment at Springhill, Brookton, Western
Australia" (1975) in order to give readers a detailed
view of his early work.
Chapters 5 and 6 describe the creation of WISALTS; the community science that they practice; and, importantly, the long history of official opposition, both scientific and political that Harry Whittington and WISALTS members have faced. Despite this climate of official opposition, the technology has been successfully implemented by many farmers in Western Australia and other states. The WISALTS organisation remains committed to its stated aim of developing sustainable agriculture, which will recover degraded land and maintain the health of the land and its farmers for the next generation.
Chapter 2: Conservation Must be Our Concern

“It is a constant source of frustration to me that while this country is facing a massive land degradation problem, I am constantly receiving requests from people, and this includes politicians, who are seeking funds either to prop up inappropriate systems of land use or develop more of the same. Despite the obvious lessons of the past I can assure you the political pressure to flood the inland, irrigate saline soils, drain swamps and release marginal land for cropping is as strong as ever. Surely it has been shown that reliance on the “technological fix” when problems of management become serious, is akin to building a house without a plan and hoping for the best ... The overriding task is to convert the basic principles into economic land use systems ... A balance will have been achieved when we have developed systems of land use where conservation is regarded as an integral part of the production system, not as a side issue or someone else's concern (Kerin, 1984)

In examining the issue of sustainable farming methods, it is useful to look back at the farming techniques of Australian colonists over the past 200 years. They, like their contemporaries in North America, were avid land grabbers who saw the new land as an opportunity to create a better living than they could ever have enjoyed in the Old Country. They brought with them farming techniques which required clearing large tracts of native bush and planting European crops in order to provide food for the colony. Much of this initial farming was done in ignorance of the climatic conditions likely to occur in Australia and without an extensive knowledge of the make up of the soil and its ability to carry crops.

It was from these pioneer farmers that the quintessential image of the ‘Aussie battler’ evolved. They lived in small isolated communities, dependent on good rains at the right time to grow their crops. Their lives were hard and they developed a fiercely independent streak. Land was available to be cleared and, over the years, in order to maintain their viability and to compensate for reduced production on cleared land, farms were expanded more and more. Some areas around the Flinders Ranges in South Australia produced abundant crops for the first few years, only to be hit by drought and reduced fertility which forced the settlers to walk off their land, leaving only the ruins of their homes as a reminder of the harsh reality of farming in Australia.

Australian farmers are, first and foremost, businessmen who have to take informed decisions about crops and stock, which will provide for their future profitability. The vagaries of farming in Australia are often extreme and landholdings are of necessity vast. These factors may influence farmers to have a more businesslike relationship with their land compared to the more romantic relationship with the land traditionally enjoyed by European farmers. Nonetheless, given their dependence on their farms to provide for their families and the fact that many have been held in the same family for generations, I would suggest that Australian farmers still have a sort of spiritual link with their land; they nurture their land and their stock, almost as they would a child. Their paddocks have names, often with personal historical significance. They know every patch - where the good ground is, where it is going bad, which area produces the best feed and so on. They know something about the soil they work with, when to apply fertiliser, etc. They have control over what they do to their land, but they have no control over the weather or the world prices they may achieve for their products. They have to live with the disappointments of a poor or damaged crop and sickness within their herds. In Australia where drought is common for long periods over much of the country, the weather plays a dominant role in whether individual farmers will be able to find the finance to plant and fertilise a crop to eke out another year; whether much of their valuable top soil will be blown or washed away; or whether they will have to walk off their land. In addition, the damage caused by farming marginal land to the point where it has become salt affected and unable to carry a crop has ramifications for the financial, physical and mental stability of the landowner. Many farmers, following advice from specialists and believing the publicity of the large chemical and grain corporations, have reached a point where their only
solution must be to try and sell their property or just to walk off.

“The human problem is easily misinterpreted when ties to the land and the emotions accompanying such a 'love of the land' override our ability to grasp the environmental impossibility of maintaining some of our production systems on a permanent basis” (Roberts, 1986).

Australian farmers’ main aim is to be productive in terms of inputs and yields. If decreasing fertility results in lower production, then they have been encouraged to purchase and clear more land. In so doing, they have been tied to the banks and the uncertainties of interest rates. The question of soil conservation and rectifying the problems that have arisen on their original farms are not often an element of this equation, purely because the problem is deemed to be too great, too expensive and, therefore, not one farmers can cope with by themselves.

Butzer (1974) has suggested that

“there is a crying need for ecological thinking ... The success or failure of conservation methods depends on social attitudes as much as anything. The traditional values of the Euroasian peasants have, by and large, preserved soil resources indefinitely...with few if any options to find new land.”

He goes on to say that

“most North American farmers’ overriding concern is short-time and profit. Whatever success the US Soil Conservation Service has had in checking erosion can be attributed to its educational programme in convincing the farmer that erosion means less cash. The US farmer expects outside assistance to tackle any environmental problem and environmental hazards have become equated with governmental responsibility...As a result, conservation is not practised independently but becomes a matter of politics at the country, state and even federal level. Erosion, once out of hand, becomes an expensive problem to check, but the responsibilities that were shirked by the offending farmer ultimately require major capital expenditures, a tax burden to be shared by the nation at large.”

Aldo Leopold, a noted environmentalist, discusses the way in which the profit motive has imbued society with a careless attitude towards the land.

“There is as yet no social stigma in the possession of a gullied farm, a wrecked forest, or a polluted stream, provided the dividends suffice to send the youngsters to college” (Leopold, 1953).

Further, he suggests that

“what conservation education must build is an ethical underpinning for land economics and a universal curiosity to understand the land mechanism. Conservation may then follow” (Leopold, 1953).

In Western Australia, there have been warnings about the possibility of salinity, soil erosion and other devastating effects of clearing since the late 1800’s. W E Woods presented a paper to the Royal Society of Western Australia in 1923 on the increasing salt content of dam water derived from his journeys across the Wheatbelt and the south west as a railway engineer. In 1917, Professor J W Paterson, from the University of Western Australia, claimed in a submission to the Royal Commission on Mallee Belt and Esperance Lands that “probably one third of the area considered for development was too saline for profitable farming” (D Berry, 1997). Berry notes that the response to Paterson’s misgivings was

“...the Commission having given the question close consideration, strongly urges that scientific prejudice against our mallee lands not be permitted to stand in the way of their being opened up for agricultural purposes” (cited in Berry, 1997, p35).

The Wheatbelt expansion of the 1920’s was “a gamble taken by each individual farmer, backed by the State Bank with money, but not sound agricultural advice” (Jasper, 1984). As a result, when crops failed, many farmers could not afford to service loans and either sold off part or all of their holdings.
Even more land was made available to be taken up by settlers in the fragile rangelands around Esperance as late as the 1950’s and 60’s. 0.6 million hectares of sand plain country was released for development under a scheme with an American financier, Allen Chase. The scheme required the government to survey the land and build roads, while Chase and his successors in the scheme, the Esperance Land and Development Company undertook

"to develop at least half of each block and to sell at least half of those blocks within 15 years. By this agreement 458 farm blocks were to be created" (Jasper, 1984).

This was in addition to 425 Conditional Purchase blocks in the region, which also required substantial clearing to be carried out.

Jasper (1984) points out that in the 1960’s, under the Brand Government, some four million hectares of uncleared land was released for agricultural use. A feature of these releases was that

"people from interstate and overseas were deliberately encouraged to apply for blocks (thus resulting in an unofficial migration scheme), and that the releases were happening at a time when the mining industry was being established in the north of WA and development was a driving force motivating the Government" (Jasper, 1984, p9).

The period 1949-1969 was a time of impressive growth in agricultural output which no doubt fuelled the drive to release such huge areas of land for agriculture. However, after only 20 to 30 years of conventional farming, these rangelands were badly scarred and unproductive. The soil was not fertile enough to carry traditional crops without massive applications of expensive fertilisers and other minerals. In addition, clearing the land has encouraged wind and water erosion and consequent saline encroachment. As a result, many leaseholders were unable to continue on such marginal land and suffered huge financial and social problems. Jasper (1984, p9) describes this as "government sponsored poverty and isolation".

Little research was carried out on the agricultural viability of much of the land released and research did not appear to be valued by the politicians when it questioned their policies. Jasper quotes Premier Mitchell in 1930:

"Be careful, mind where you are stepping! At one time or another we have been told that we could not grow apples or wheat or establish dairying. Such a cry might be useful to a do nothing Ministry, but we cannot afford to be slothful...I am afraid if the Good Lord had provided scientists when Adam and Eve were created no useful work at all would have been done" (West Australian, 1930 quoted in Jasper, 1984, p9).

Succeeding state governments were infected with this ‘frontiersmanship’ and their perceived need to achieve huge exports of agricultural, timber and mineral products in order to prove that Western Australia was ‘the’ state compared with its eastern neighbours. The lands of the state were raped for profit. Politicians, particularly in the era of Sir Charles Court, saw such exploitation as vital to sustain necessary economic development. After all, Western Australia was a huge state and there were large areas of land and forest to be utilised. Court summarises his attitude to conservation as follows:

"At all times in considering legislative and other requirements it was foremost in the mind of myself and colleagues that protection and management of the environment had to be kept in proper and balanced perspective. Without strong economic development it is not possible to provide for the essential needs of an expanding population, including the protection of the environment. This means that our natural resources need to be put to work in an imaginative way, striking a sensible balance between what has to be achieved economically and what is responsible in terms of environmental protection. To ignore the demands of human beings for ever-improved standards of living is to be quite unrealistic, as governments are now finding” (Court, 1991).

This economic, developmentalist view has long dictated agricultural and land use policy administered by government departments concerned with the viability and exploitation of the land. Roberts (1990,
p158) applauded the initial development of the various agricultural extension services in Australia but on inquiry has found a disturbing change in outlook of many extension officers who see their role as simply passing on technical information about animals and cropping.

"Enquiry reveals that because most time is spent on ad hoc problem solving a low priority is allocated to broader and longer term issues in land use planning and the maintenance of land potential. Some officers see their only function as assisting with scientific information on request from the landholder and are content to contribute only to the application of more production techniques. Others regard economic survival of individual landholders as their prime task. These technocrats and survivalists defend their role on both departmental and humanitarian grounds. In other words, their employing organisation has specified their job description in terms of technical advice, or they as individuals have satisfied themselves that their first duty is to the family and their financial viability".

This “departmental way of life” (Roberts 1990, p161) has also influenced the way that farmers see their own problems with many simply continuing to farm in the traditional manner, relying on pesticides, artificial fertilisers and other technologies because that is what ‘the Department’ recommends. It is easier to rely on advice that has official backing than to undertake, sometimes costly, alternative solutions which ‘the Department’ has either not advocated or decreed as ineffective. It is also, unfortunately, a factor of such traditional methods that many farmers have got caught up in a debt cycle and do not have the financial ability to make changes that would benefit their land and livelihoods. It follows that such farmers are, therefore, very receptive to government funding for tree planting and other such projects, even if they do not always believe that simply planting more trees is the answer to salinity and other land-use problems.

Mercer (1991) concludes that

"many of the ills now facing rural Australia have been caused by decades of the indiscriminate application of conventional agriculture, a system that is still very strongly entrenched and which serves powerful economic and political interests”.

In the past, there appeared to be little official recognition of the need for remedying the ecological mistakes of individual farmers. Rather many have been advised in the case of salt encroachment to “just fence it off and forget about it” (Richards, 2000). Some scientists have embraced the view that the affected land will reach equilibrium and heal itself. In the Vol 2, 1997 edition of the Journal of Agriculture, it was cited that

"By the year 2010/20, the area of salt affected land is forecast to rise to 17 per cent and could go as high as 32 per cent (6 million hectares) before a new salt balance is reached” (my italics)

That may be possible if all agriculture and human influence was eliminated but even then most people agree that it would take hundreds of years, maybe more to restore the land to its original pre-farming conditions (B Whittington, 2000).

The preceding has been illustrative of the way that many people still see the land. Going back to Aristotle, humanity has had an anthropocentric (man at the centre) view of the world. It is a feature of the scientific age we find ourselves in that human beings are the “reference and terminus of all thought” (Bosselman, 1995, p4). Such centrism has dictated that we consider nature as a tool rather than an equal partner. However,

"we do not live autonomously next to an environment that happens to surround us, but we live with it, together in one single world. Our environment is our with-world” (Bosselman, 1995, p4).

It is as a result of the developmental excesses of preceding generations that present generations are gradually turning more and more to “eco-centrism” which sees nature

"in its own right, setting its own standards which humanity must consider in the evaluation of its own requirements” (Bosselman, 1995, p7).
We cannot expect nature to rebound automatically after humans have crushed it. It may come back but not always in its original formation. Something will have changed because nature is continuously evolving to deal with new conditions imposed upon it. Many species of flora and fauna have been rendered extinct or in danger through human interference in the natural cycle. What we as a society have to do is to assist nature to do its work and, at the same time, fulfill our needs not by changing its basic mechanics but by creating and supporting the natural conditions that it needs to flourish.

Human experimentation with changing the character of seeds and animals sets a dangerous precedent. Vandana Shiva recently spoke about the impact on Indian peasant farmers of the push by seed companies to persuade them to abandon their traditional biodiversity and plant new hybrids, such as cottonseeds which they refer to as “white gold” (Shiva, 2000). Far from making these farmers rich, they have had to apply extra pesticides because the hybrids were vulnerable to pest attacks and they lost money when crops failed, resulting in a rising rate of suicides. In addition, new seed had to be purchased for the following year because they could not save the seed from the new plants, as they would have done with traditional crops (Shiva, 2000). In fact, Shiva writes that seed companies have hired private detectives to stamp out traditional seed sharing amongst peasant farmers because it will affect sales of their new seed varieties. By promoting the use of chemicals and pesticides these global companies are also diminishing the natural biodiversity, which has provided food and medicine to millions over the years.

“When giant corporations view small peasants and bees as thieves, and through trade rules and new technologies seek the right to exterminate them, humanity has reached a dangerous threshold. The imperative to stamp out the smallest insect, the smallest plant, the smallest peasant comes from a deep fear - the fear of everything that is alive and free. And this deep insecurity and fear is unleashing the violence against all people and all species” (Shiva, 2000).

She warns about the increasing dangers of globalisation and the supremacy of economic viability. Increasing production of monocultures may increase yields but only if the conditions are right and bees are available to pollinate. However, in so doing bio-diversity is lost and the poor and the hungry - the very ones that global corporations claim as beneficiaries - are left even poorer and even more hungry. Shiva, instead, calls for an increased awareness of the need for biodiversity and sustainability to ensure a healthy planet.

“In giving food to other beings and species we maintain conditions for our own food security. In feeding earthworms we feed ourselves. In feeding cows, we feed the soil, and in providing food for the soil, we provide food for humans. This worldview of abundance is based on sharing and on a deep awareness of humans as members of the earth family. This awareness that in impoverishing other beings, we impoverish ourselves and in nourishing other beings, we nourish ourselves is the real basis of sustainability” (Shiva, 2000).

In the same series of Reith Lectures, Tom Lovejoy spoke about the work that had been done in California to redress some of humanity’s development excesses and the recognition that maintaining biological diversity was essential to the whole planet’s future. He said,

“Biological diversity lies at the heart of sustainable development. The quality of our lives is entwined with it so much more deeply than most of us ever notice that our fate depends on how well we provide for the future of other forms of life. This goes way beyond the obvious and essentials of food, fibre and shelter, to medicines and complex industrial processes. Biological diversity is essentially an incredibly vast library for the life sciences which is drawn upon to improve critical biologically based enterprises like agriculture and medicine” (Lovejoy, 2000).

He advocates bringing the responsibility for protecting diversity back to the people and empowering them to work together to achieve sustainability. It is too late to wait until a species becomes extinct.
“If nothing is done until a species reaches the brink of endangerment, inevitably there are economic interests squared off against a species with an obscure name. So even though this is a signal that the region is beginning to unravel biologically, the situation is easily caricatured as people vs. biological esoterica” (Lovejoy, 2000).

‘Economic rationalism’ was the buzzword of the 80’s and 90’s. It was deemed an adequate explanation for many government and corporate policies, which took the side of humans against the ‘expendability’ of nature. Nowadays, commentators talk about being ‘good corporate citizens’ and the necessity to appear ‘caring and green’. A lot of money is spent on advertising to persuade consumers that what they are doing is for the best. Unfortunately, too much money is spent on glossy brochures while the real excesses continue to degrade the viability of the planet.

Society in general is now more aware than ever before of the impact humans have had on this planet. This has come about through education in schools and through the media. The ease of global communications means that we can see environmental disasters as they occur. However, such disasters as the devastating floods and mudslides in the Honduras in 1999 have still concentrated on the very real human costs, with little coverage in the popular press given to the fact that large areas had been systematically logged and thus contributed greatly to the severity of the floods. The hillsides that were still forested markedly slowed down the speed of the water flowing off of them (Lovejoy, 2000).

Of late, ‘green’ concerns have become important electoral issues, hijacked by politicians to win votes. Despite the fact that salinity was first mooted as a huge problem in Western Australia back in the early 1900’s, in 1997

“full recognition of the magnitude of the problem came last November when the State Government launched its Salinity Action Plan, which acknowledges salinity as ‘Western Australia’s biggest and most dangerous environmental problem’.”

“It will be a long and costly war, but it must be fought. And it has to be won. Three billion dollars needs to be spent over the next 30 years, and 3 million hectares of appropriate trees and shrubs will have to be planted to make a ‘significant’ impact on the problem” the government says” (Berry, 1997).

In November 1997, Dr Syd Shea, then Executive Director of the WA Department of Conservation and Land Management was quoted as saying that “it was only in the last year that the true scale of the salinity problem had become evident” (West Australian Newspaper, 24 November 1997). This was quickly countered by Conservation Council Coordinator, Rachel Stewart

“It is amazing that Dr Shea claims the Government only realised the scale of the problem in the past year when they looked at satellite pictures... What Dr Shea fails to mention is that the conservation movement and others warned governments and departments for 50 years against massive clearing of native vegetation in the agricultural region, which is what created the salinity problem. Now Dr Shea criticised conservationists for standing in front of bulldozers in the forest. It would appear that the government is trying to blame conservationists for its failure to deal with the massive environmental problem of salinity” (West Australian Newspaper, 25 November 1997).

It is to be hoped that the West Australian Government’s Salinity Action Plan will ‘win the war’ but, again, simply talking about the problem and looking at it in an economically rational light will not create the necessary change of outlook that is vital to achieving sustainability.

“Despite numerous warnings over the years, man has recently been somewhat bewildered by the fact that Nature has slapped him in the face for insulting her ecosystem. (One of the best examples of this is at Childers in Queensland where a whole community of 70 families were forced to abandon their eroded land after less than a century of cane farming.)
Nature has answered back and Man has stumbled into an ecological trap. Civilisations have been living on promissory notes for generations and now they’re falling due all over the world. In economist’s terms, we have been living not off our interest, but off our land capital.

The writing is on the wall but ignorance, vested interest and complacency make Man go on doing what history has clearly shown him to be wrong. Nature has sent us a final notice - payment is due and we now need to decide how we shall pay, not whether we shall pay.

So we find that today, the status of the ecological problem is not determined by its age or its academic merit, but simply by its urgency” (Roberts, 1974).

Obviously, we live in a very complex world both in terms of the processes of nature and the way in which human society has developed. However, the condition of the earth has gained a much wider focus over the past 20 years and the importance of maintaining the planet’s sustainability has become very real - both through our television screens and by the degradation of the land and rivers which surround us. It is evident that until the population as a whole (both individuals and corporations) starts to really think about and really practice sustainability, only piecemeal solutions will be carried out and no effective change will be achieved. Corporations will continue to court governments and tamper with seeds and plants, in the public name of improving them for humanity but with the private aim of achieving and maintaining a monopoly. It has surely been proved without doubt in countries like Australia and America where large-scale monocultures have been the norm for many years, that such farming practice is not sustainable and is in fact detrimental both to the environment and the people that depend on it for livelihood.

The Brundtland Report “Our Common Future” (1990) defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

There is, for me, a troubling echo when using the term ‘sustainable development’. Sustainability by itself describes the need to sustain ourselves and the world by doing only what is necessary to achieve basic human needs. Development engenders an image of knocking down nature to develop... buildings, farms...as if what the planet supplies is not enough to support human society without ‘developing’ it, changing its makeup and creating new products. Of course, society today is technologically advanced and it is human nature to continually press for new inventions and new solutions. We are the ultimate consumers and need to be entertained by new and better things. However, it seems clear to me that while we continue to justify development as necessary to uphold our standard of living, the environment will never receive the vital attention that it requires NOW.

The environment has been degraded in the same way that human communities have begun to decay. In cities, and to a lesser but growing extent in country areas, people are living isolated existences, fostered by the advent of individualised technologies like cars, television and global communications. Building and maintaining a community is hard and ongoing work and, for many people, the pressures of extended working hours and financial responsibilities preclude opportunities to contribute to community. Until such individuals are convinced of the need to stop and look at society and the environment that it has produced and are encouraged to contribute in a positive way, getting together with others to change existing attitudes, then environmental and human degradation will continue.

Legislating for environmental protection is important but in many cases provides a battleground for people to take sides. It is natural for farmers to become defensive when they feel that their land and their freedom to farm it as they wish is impinged upon. “Greenies” can achieve much, both through the media and politically, to alter the outlook of city dwellers to environmental problems. However, there is a great danger that this creates a ‘them and us’ situation, where the farmers are portrayed as the bad guys. What is needed is a positive ethos of everyone working together to solve the problems of the land and accepting the realisation that, while production levels and profits may not be as large,
society can leave a sustainable land economy for the future. As Aldo Leopold has said,

"We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect" (Leopold, 1966).
Chapter 3: Community Science

Traditionally, scientists have been portrayed as being isolated from the general population by reason of their advanced scientifc knowledge and often obscure research projects. These barriers have contributed to an aura of inapproachability, which has lead to a tendency on the part of the general population to be in awe of science.

Papers published in scientific journals are often heralded as the next big discovery, when in fact some of these ‘discoveries’, when further researched, have been found to be inconclusive or conflicting with the findings of others. As with much academic writing, particularly in the field of science, the efficacy of the hypotheses can be created by the subtle framing of the experiment.

This was illustrated by the anomalies in the public statements of scientists in connection with possible soil contamination in the hill country around the Sellafield Nuclear Power Plant in the United Kingdom following the Chernobyl nuclear power meltdown. Scientists maintained that “Sellafield and Chernobyl contamination could be clearly distinguished by the typical Cs 137/134 isotope ratio” (Wynne, 1991). However, the farmers were not convinced of this given an earlier mistake by scientists “over Cs mobility in acid mountain soils and...unacknowledged uncertainties that the farmers had seen for themselves” (Wynne, 1991).

It is not doubted that scientists strive to make valuable discoveries which will benefit humanity but invariably scientific research is very expensive and, as Sclove (1997) suggests, can be open to question when researchers are funded by particular corporations, governments and other organisations. “The result is that research agendas often favour elite groups helping them to maintain positions of privilege”.

This was further illustrated by Jerome Delli Priscolli (1989) who described a study of projections of water use and energy needs in the north-west USA. The various projections studied ranged from a growth in energy needs put forward by the “utility company” to a downward progression produced by an environmental group’s survey. Other groups found projected needs to be somewhere in the middle.

“Each projection was done in a statistically ‘pedigree’ fashion. Each was logical and internally elegant, if not flawless. The point is, once you know the group, you will know the relative position of their projection. The group, organisation or institution embodies a set of values. The values are visions of the way the world ought to be” (Delli Priscolli, 1989).

Roby (in Barns, 1984) in discussing the varying outlooks of scientific philosophies suggests that those who would compartmentalise science as completely unconnected with metaphysical or religious thought reveal “in the ‘triumph’ of science as the only meaningful knowledge, over ‘metaphysical nonsense’ and ‘wishy-washy humanism’”. Those who ascribe to this view see science as value-free and do not have any problem in adhering to a philosophical or religious view that equally sees no role for science in that particular area of belief.

Science has, in the past, also been used as a political tool to explain the superiority of one race over another or to create dreadful weapons, the use or even the threat of which it was hoped would change the course of history. It has created the technological society in which we live - a society in which religion and cultural beliefs play a minor role compared with the innovations of scientists in satisfying our consumerism.

Roby argues for a complementary role for science and the humanities.

“Science and metaphysics, science and religion, science and the humanities are distinctive realms, yet have much in common and drawing upon one another. The maintenance of dialogue between these realms is essential for the furtherance of all” (Barns, 1984, p26).

It is interesting to note that especially in the field of human health, people are increasingly seeking to
combine the benefits of modern medical science with natural therapies, which in the recent past have been referred to as ‘old wives tales’ and ‘mumbo-jumbo’. These same natural therapies had been the original method of treatment before medical science usurped their place in society. The ethos behind many of these natural therapies was the need to examine the whole person, to treat the cause, not just the symptoms. In an age when society demands instant fixes for both technological and health breakdowns, medical science has tended to err towards the use of technology and broad spectrum drugs as a convincing method of easing ailments - blinding the patients with science and with a dose of antibiotics just in case!

Roby, a scientist who did much work on encouraging recognition of the need for science to become more aware of basic community needs, coined the term "community science" because of its orientation towards the wider community. Community science refers to that portion of the scientific effort directed explicitly and primarily towards human fulfilment, social well-being and the resolution of critical contemporary issues, within the context of a search for a just and sustainable society" (Roby, 1981).

He saw community science as needing to be “listening and responsive” and that it should be sensitive to local and cultural knowledge in defining and carrying out its research. It also “has the function of bridging scientific knowledge and public knowledge by making available information that ought to be widely known” (Roby, 1981).

In contrast to the traditional sciences which would see themselves as necessarily value free in order to protect the objectivity of their findings, the interdisciplinarity of community science necessitates consideration of “social, ethical, philosophical and political dimensions” (Roby, 1981) so that any solutions will be whole community solutions rather than piecemeal and unconnected to the wider need. As Roby concludes when talking about a proposed course in community science, “a student should be projected into rather than separated from the wider community” (Roby in Barns, 1984, p97).

Wynne (1991) agrees with this ethos for community science and suggests that "one obvious practical implication is that scientific and policy institutions that want to integrate science into lay public lives must be organised so as to better understand and relate to public agendas and knowledges, rather than wishing to impose a scientific (which often means standardised) framework of understanding as if that on its own were adequate”.

Slove (1997) describes the Dutch model of “science shops” which have grown up in response to a need for “community-based research” which can assist lay community groups to find solutions to social and environmental problems. The shops are staffed by university teachers and students and they research projects brought to them by concerned community groups who can “show that it lacks the resources to pay for research, is not commercially motivated and will be able to use the research results productively” (Slove, 1997). These science shops enable communities to gain access to scientific research that can help them to identify specific problems and give them the necessary background to mount strong cases for remedial action.

This book, however, looks at community science from a slightly different angle to that espoused by Roby and Slove. Their definition, whilst taking into account the community’s needs and knowledge, tends to emphasise the important role of the scientist in researching these needs and finding a solution. The definition I propose to follow is that put forward by Stocker (1995) of community science as members of the wider community coming together and practising science, often with some guidance from trained scientists but, equally importantly, devising their own solutions through trial and error to environmental problems which they face in their everyday life.

“Community group science is critical to the success of ecologically sustainable development and conservation activities because community members have a sense of ownership over the knowledge and commitment to its implementation. This is not simply because they have done the work, but
because the findings will best meet their cultural and social needs, and will be appropriate to their local environments” (Stocker, 1995).

Although not recognised as scientists in the accepted meaning of the word, farmers are in fact conducting live scientific experiments in their day-to-day farming with various forms of land treatment, practising diversity in what and how they grow and using the results to dictate their future plans for their farms. They have an intimate knowledge of their land and although “the scientific account is valuable...the situation requires more than scientific understanding” (Wynne, 1991).

The history of European-style farming in Australia is very short and in many areas signs of deterioration became evident only a few years after clearing took place. Many farmers have the advantage over scientists in that they have been able to observe particular patterns and developments over this time. They knew the country when it was in good condition, often from before it was cleared of native bush and can detail the gradual deterioration in their land and yields. Harry Whittington, for example, was able to recall the clearing history of Springhill, his family property at Brookton, and described in detail the changes in the condition of the land and the availability of water in his booklet - “A Battle for Survival Against Salt Encroachment at Springhill, Brookton, Western Australia” published in July 1975.

Another benefit of having the ‘scientist’ based in the rural community rather than in an isolated laboratory (often in a city) is that solutions can be devised and implemented to suit particular locations, in partnership with individual landowners and community members. This is very important in the development of the interceptor bank system devised by Harry Whittington, as the location of the banks will depend very much upon the local conditions. Having an expert on-site who can examine any unexpected findings will ensure that effective solutions for that particular situation are put in place. WISALTS (Whittington Interceptor Sustainable Agriculture Treatment Society) require all farmers who wish to implement the Whittington Interceptor Bank system on their properties to become members of the Society. They feel that it is vital for such farmers to understand the technology and the need to practice sustainable agriculture in conjunction with the interceptor banks (P McGregor, 2000. Pers comm). People are much more likely to accept science if it is relevant to their own experience (Wynne, 1991).

Harry Whittington played a major role in creating awareness of the huge problem of land degradation in Western Australia through his attention to detail, his willingness to practise his own science and his tenacity and commitment to getting something done both within the community and in farmer representative, political and departmental arenas.

“Whilst people tend to focus on the interceptor method of treatment that Harry developed his most important contribution was to create the ethic of land care that is now so well established in Western Australia” (Ryan, 1991).

Networks such as WISALTS play a vital role in the exercise of community science. There may be no single ‘expert’ and group members must work as a team to promote awareness and understanding of their concerns. Community groups can fail very quickly if they are not built on strong foundations with aims that the whole group can support.

The strength and complexion of relationships between community members and government experts and advisors can define the efficacy and longevity of the particular group. Too often, government department representation on a committee may produce an unequal power distribution to the extent that general committee members are unduly influenced towards approving the department line (McGregor, 2000). This can result in community knowledge and concerns being given little weight. The subsequent disempowerment of non-government committee members may lead to disaffected members walking away from the process altogether, leaving the committee to function purely as a deflated ‘rubber stamp’ for department policies.
Craig, Saunders and Mattiske (1995) support this position and suggest that

“Government agencies involved in nature conservation are usually acting as trustees of conservation resources on behalf of the people, but often behave as if they are owners, rather than trustees”

and that

“most act as ‘government servants’ first driven by conservative interpretations of relevant legislation rather than the needs of the various stakeholders. In contrast, responses to the public tend to be reactive and too often defensive and authoritarian”.

In contrast, when government employees “attempt to work cooperatively and proactively within a broader conservation network” (Craig et al, 1995), they run the danger of taking positions that may be frowned on by the bureaucracy with consequences for both their workload and sometimes their future career prospects (McGregor, 2000).

“I hope to implement a few ‘Whittington’ type systems on suitable sites I find during my normal working duties for the Department. The problem is finding a farmer who is keen to do this type of work properly, has the finance and will not complain to Head Office if we run into troubles...PS. Please excuse the writing - I am not game to have this letter typed at the Dept” (Anon, 1976).

Landcare groups have been formed over the past ten years by groups of farmers and concerned community members in an attempt to find solutions for their local environments. These are federal government funded organisations and they are usually assisted and administered by Agriculture WA staff. Some have achieved short-term success in dealing with salinity, erosion and other local problems mainly through planting trees and other salt-tolerant plants and fencing off creeks and waterways to prevent overgrazing. In so doing they have also succeeded in building ongoing community awareness in their local area.

However, there have been instances of Landcare groups obtaining funding for commissioning reports which, when completed, have not been at all useful because the researcher was ignorant of local conditions and their findings were irrelevant to the commissioning group’s needs. Textbook solutions have been recommended which clearly would not succeed on the ground, leaving the commissioning group with diminished finances and no clear path or solution to follow. One such instance was of an ‘expert report’ recommending the planting of grape vines to increase water usage over winter in areas prone to waterlogging near Northam, notwithstanding that grape vines are dormant at that time of the year and would be unable to use such large amounts of water (B Whittington, 2000, G Drew, 2000). This further illustrates the, sometimes misguided, attention paid to ‘expert opinions’ by those who feel such input is vital if a project is to be considered workable and worthy of funding, and the subsequent frustration of those with more relevant local knowledge.

Campbell (1997, p143) suggests that

“it could be argued that the energy and paper expended in seeking, obtaining and accounting for funds and complying with the funding timetable has detracted from more imaginative, catalytic activities using local resources; leading to a formalisation of Landcare and a perception that if you don’t have an NLP (National Landcare Program) grant you can’t do anything”.

Such experiences only fuel the general scepticism with which the community treats government
pronouncements of new initiatives to combat salinity and other environmental problems as purely vote-buying exercises. Many farmers are increasingly frustrated at the lack of positive action on the ground and the apparent lack of communication between various government departments, all working on different aspects of the same problem.

It is in this climate of frustration with officialdom that farmers, concerned about the degradation of their land and loss of income, have looked for their own solutions. Farming in this state is very diverse and so have been the various solutions put forward by individuals and farmer groups. Such techniques include the Keyline system pioneered by Yeoman, deep ripping on the contour, open ditch drains as seen at the Scott Brother’s property at Watheroo, various forms of banks and drains, diversification of crops and the practice of permaculture and organic farming. Much of this work has been carried out without financial assistance from the government and without direct departmental support.

In the case of Whittington Interceptor Banks, this technology has been taken up and refined by the WISALTS organisation in the face of direct and sustained scepticism from Agriculture WA. It has flourished despite this, because it has been shown to be effective in many areas in controlling waterlogging and salt encroachment and farmers could see the practical results only a short time after installation.

Stocker (1995) emphasises an important facet of community science as “even where innovations have not been successful, it is important to acknowledge the value of experimentation by farmer groups that leads to the elimination of approaches that do not work and the adoption of those that do”.

What has become clear over this period is that solutions will not be totally effective in isolation and that treatments need to be extended to larger areas if they are to be of lasting benefit. This, however, would be very difficult to achieve without political will and government funding and, particularly, when effective solutions such as the WISALTS methods do not enjoy departmental support. It is also very apparent that there is no one definitive solution to the problems that farmers face and that various techniques need to be combined to achieve a measure of success, with a major requirement being adoption of sustainable agricultural methods.

Harry Whittington (1975) concluded

“it appears that the salinity problem in Western Australia has been, and still is being, researched in isolation, and as long as the present approaches to the problem are continued, the salt encroachment problem will continue its progressive spread.

During the time I have been associated with scientists and researchers in various disciplines, I have become aware of the vast amount of data they have at their disposal. I am confident that within the University, CSIRO and the West Australian Department of Agriculture, there are all the details and information necessary to attack the salinity encroachment problem in this State. If someone was able to co-ordinate all the principles of the relative disciplines, or a representative body of the disciplines would look at all the relative dependence and the common causes of change, a lot more progress could be achieved in all avenues. Research in isolation has slowed down the results of all the disciplines. A lot has been achieved, but we could do better.”

Whittington’s concerns have been echoed by others. An editorial in the West Australian Newspaper (6 November 1982) cited Professor Charles Birch, Professor of Biology, University of Sydney as sounding

“a warning about knowledge. His point was that people were drowning in a sea of knowledge and that lack of communication between the sciences was contributing to the world’s problems. The experts were providing only partial answers that did not fit together. What was needed was a new breed of scientists, one with a broader experience who could cross boundaries and understand”.

There would appear to be a real need for community science.
Harry Samuel Whittington was born in Beverley, in the Western Australian Wheatbelt on 29 April 1921. He grew up on his father’s property, ‘Springhill’, Brookton, where he returned in 1936 after his education at Northam High School. He was an ambitious young man and was keen to train as a pilot. Indeed he was just about to “go solo at Cunderdin” (J Whittington, 2000) when he was ‘manpowered’ back to the farm on his father’s death in 1942. That flying training didn’t get forgotten, however, as he was later to fly with WISALTS colleagues taking aerial photos of the landscape and travelling to visit people interested in using his technology.

“Very early in life, I came in contact with soil and water, saw the wonders, beauty and power of nature, watched the crystal clear creek which flowed gently throughout the year, change to a muddy, raging torrent in the winter and a dry sand bed in the summer. Saw a flourishing orchard transformed to dry tree stumps, the evergreen verges of native lucerne on the flats change to waterlogged, bare, barren soil which in time was covered with small white crystals shining in the sun. This white substance was called Sodium Chloride – just common salt to me” (Whittington, 1975 p1).

The government in the late 1890’s was trying to encourage the wine industry in Western Australia and a Government Land Grant of five acres (Avon Location 2522) formed part of his father’s property. This land was expressly for the purpose of planting grape vines, an early example of conditional land grants, later versions of which were to require extensive clearing of large tracts of land. The homestead was located close to this vineyard and clearing of the property commenced in 1902, spreading onwards from the house across the valley floor and then over the surrounding slopes. At this time, the farm produced excellent cereal crops and had ample fresh water for both animals and humans. Abundant gardens, both winter and summer thrived on the natural water runoff and the permanent creek, which ran all the year round.

By the 1930’s the creek “had filled with sand and water was not visible on the surface”. There was no longer any seepage from the banks of the creek during the summer months and in the winter it became “a raging torrent of muddy water” (Whittington, 1975, p9). Erosion on the slopes had increased and some ‘rills’ (furrows) were over three metres deep. Large areas of the property which had previously been so fertile, now produced little, water holes had dried up or become salty and the valley floor had become waterlogged and unusable.
“This method of cultivation was acknowledged by all, and any farmer who did not follow the established pattern was regarded as a lazy farmer who was said to be lucky if he produced a good crop” (Whittington,1975,p7).

Whittington also suggests that this method of cultivation, first by horse drawn ploughs and later by tractors, encouraged compaction of the underlying ground. He called this compaction “the plough sole” or “hardpan”. As the fine top soil was washed away, the coarser grains remained in place and gradually hardened, thus preventing water from trickling down through the subsoil as it had when the land was vegetated by deep rooting native plants. Cereal crops such as wheat and oats were shallow rooted and did not penetrate the “plough sole”. They survived on surface water and when that water was not available, the crops failed. Whittington states (1975,p9) that shortly after clearing of natural bush "there was an increase in the number of shallow fresh-water soaks which gave a reasonable supply until early summer. Some lasted until mid-summer and then dried out. It can be assumed that these shallow, short-

Whittington (1975,p7) describes how “most fields were divided into lands for ploughing. A ‘land’ was a strip or area approximately 40 metres wide, running the longest way of the field”. These lands more often than not ran up and down the slope to make the job of the horse pulled plough easier. This style of ploughing and cultivating the soil caused most of the soil erosion and gullying to be found on farms throughout the state as “the fine tilth” was easily washed away by rain down to the valley floors where it remained waterlogged and if it ever dried out, set like concrete due to its fine consistency.
period supplies were perched water tables, caused by the eradication of the vegetation”.

These supplies soon disappeared, however, with increased cropping and stocking.

As salt encroachment and waterlogging increased in the valley floor, the Springhill homestead fell victim to its insidious march – “I remember Harry and Lal saying that when they were sitting in their sitting room they could hear the plaster falling off the walls” (Conacher, 2000) - by 1958 it was not habitable and had to be finally demolished in 1963.

Figure 1 shows the level of salt encroachment mapped by Harry Whittington on Springhill between 1935 and 1946. Note the location of the homestead (by the well in Lot 4534), right in the middle of the salt affected landscape.

Figure I: A map of salt encroachment on the Springhill property at Brookton, Western Australia from: A Battle for Survival Against Salt Encroachment at Springhill, Brookton, Western Australia July 1975 (p10).
Location No 9326 (11 acres) was a Government Water Reserve which showed signs of salt damage by 1938. This had increased dramatically to the point where in 1946 it was at the epicentre of the salt damaged land on Springhill.

By 1946, the amount of land degraded by salt on Springhill had severely reduced pasture area requiring a cut in numbers of sheep stocked, wool quality was affected due to the poor quality of feed and yields from crops growing on the slopes had also diminished “below the point of profitability” (Whittington, 1975, p11).

Whittington turned to the Department of Agriculture for advice and their officers suggested planting salt tolerant trees such as salt river gums and tamarisk and supplied seed and plants for grasses (Paspalum vaginatum and tall wheat grass) and bushy salt tolerant shrubs. They described his problems as evidence of a “rising salt water table” (Whittington, 1975, p11).

Despite persevering with these suggestions over the next few years, Whittington found that the only plants to flourish were the tamarisks planted along the edge of the old creek. The “salt tolerant” grasses died from lack of moisture or from being permanently waterlogged. He soon realised that

“Departmental policy was one of tolerating the problem, accepting the fact that once land had become salt affected, it could not be restored to fertility again, and that to grow any type of salt-tolerant grass or tree on the area was as much as could be achieved” (Whittington, 1975 p12).

This was the case in 1946 and, many would argue, is still the case now in 2000!

As natural fresh water supplies dried up on the property by 1951, he had to build dams to harvest water that had once been in abundance. This was after only 50 years of farm production.

Whittington had an inquiring mind and was willing to try any possible solution to improve his property. He sought out knowledge and information from Department officers, scientists and farm groups as to the best way to improve the profitability of his farm. John Whittington (2000) has said of his father that he judged solutions according to their chances of commercial success and, at the beginning, did not appear to have the more holistic outlook that he developed as he learned more about the soil and how it worked in later years.

Having tried the solutions he had been offered by the Department of Agriculture, he was dissatisfied with their advice and would not consider simply fencing off the problem and hoping it would go away.

Concerned by the decrease in production on the property, he arranged for soil tests between 1948 and 50 which showed that 55-60 per cent of the superphosphate which he was applying was being leached out of the soil by water. To counter this he would have to increase the rate of application by at least two and a half times (Whittington

1952 Springhill: Avon Loc No. 19910. By the scouring that is still taking place, the pasture furrows and absorption banks are not really controlling the runoff. It was from this evidence that the interceptor bank was introduced. (H Whittington)
1975, p12), a process which would have been prohibitively expensive with little assurance of major improvements. There was also the question of a diminished supply of water.

Around this time, Whittington had seen a film produced by the Allis Chalmers Tractor Corporation, which depicted engineering work being carried out in the Tennessee Valley in the USA to control erosion around dams being constructed for hydroelectric power plants. This work was carried out by the Soil Conservation Authority, a body set up by Congress in 1933 on the recommendation of Dr Hugh Bennett, US Director of Agriculture. America’s agricultural output was based on large-scale production and they too had encountered problems with both water and wind erosion of the soil and leaching by sub-surface throughflows1. Whittington requested more information from the US Department of Agriculture, much of which he admitted was “over my head” (Whittington, 1975, p13), but he could identify similarities with the problems he was experiencing at Springhill (water erosion on the slopes, leaching of the soil by throughflows and waterlogging of the valley flats).

The US Department of Agriculture information described how the sub-soil strata could become sealed or impermeable allowing surface water to flow downslope at a fast rate leaving the valley wet after rain. The speed of the water downslope encouraged gullies to form and subsequent loss of usable topsoil. The build up of ‘fine soil particles’ (washed down from the slopes) on the valley floor effectively sealed off subsoil drainage and this coupled with the slower movement of the sub-surface throughflows effectively created waterlogging in the valley floor. Surface water was too slow moving to run away quickly in creeks or streams and could only be evaporated by the sun and wind. This permanent dampness of the soil reduced the oxygen available to soil organisms which in turn inhibited plant growth (Whittington, 1975, p14).

Armed with this new knowledge, Whittington conferred with Lyn Lightfoot who was then Commissioner of Soil Conservation, WA Department of Agriculture. Lightfoot recommended putting in “pasture furrows” but Whittington did not agree and “decided to return home and set out to find whether I had a seepage problem, or a rising salt water table” (Whittington, 1975, p15).

The term “rising salt water table” was discussed by Teakle and Burvill in their 1945 publication “Management of Salt Lands in Western Australia”. It was to become the fail-safe diagnosis of many scientists and Department of Agriculture officers over the next 55 years. Put simply, the theory behind a rising salt water table is that as the landscape has been cleared of natural bush and planted to crops and pastures, the water that had been utilised by the deep rooted plants and trees was now trickling down at a faster rate (or recharging) into underground

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1955 Springhill: at the upper slopes where I eventually remembered my father’s advice. Build cement walls around the hilltops and hold the water where it falls. At that time I could not afford the cement. I had to use the material that was on site. Starting at the top was not easy. I had to learn about catchments, recharge areas, throughflows (natural subsurface drainage lines), seepages, discharges, false-caps, impermeable soils, reconstructed soils; to distinguish between those soils that would bond and those that would not. There was an answer, it was a matter of knowing the soil. The success of these early banks built in the upper slopes gave me encouragement to go further. (H Whittington)
water aquifers. These aquifers were thus increasing in volume because the excess water was not being used and the water was escaping back to the surface under the subsequently increased pressure bringing the layer of salt that is naturally present in the subsoil to the surface and causing salinity.

**The Experiment**

This could be said to be the point where Harry Whittington, farmer, became Harry Whittington, scientist. He knew from personal experience that growing salt tolerant vegetation was not the answer so in order to find a solution to the problems he faced at Springhill, he set out to find the cause.

Block No 4534 was the first block to show signs of a salt problem back in 1935 so he marked out the block in a grid 20 metres apart.

“At every intersection I planned to drill a hole to the dry clay, or until I could go no deeper, or I found an area connected to an underground water supply” (Whittington, 1975, p15).

Each intersection was marked with a numbered peg. With a specially designed tool, he extracted soil samples from under the salt scald. The sample holes were all hand drilled, a labour intensive operation but one which yielded surprising results. Some holes only had to go to a depth of 60 cms, a few to three metres and one to six metres to find dry clay. From these drilling results they could construct an accurate cross section of the land in that block.

One of the most telling discoveries was that they did not find one place within the block where no dry clay existed below the waterlogged surface soils. Therefore, they felt that the waterlogging could not have been caused by a rising water table.

In order to ascertain where the water was actually coming from, Whittington and his team conducted similar drilling work up and across the slope. They found that as they moved up the slope the seepage (throughflow) was “very general” until the slope gradient increased. At a distance of 300 metres up the slope from the valley floor, the throughflow

“was not so general but tended to follow the lower levels of subsoil. This pattern persisted until testing had reached three quarters of the distance up the slope, when it became evident that the throughflow was returning to a general spread across the slope and at four-fifths of the way it was not clearly visible if the water was flowing (or seeping)” (Whittington, 1975, p19).

To determine what was happening to the water at the top of the slope they dug a hole 1.1 metres in diameter and 45 cms down they struck a layer of fine impermeable clay to 2.2 metres depth. Below this was a layer of granite which they blasted with dynamite to remove another 60 cms and then drilled with a pneumatic drill a further 120 cms into the rock. A small amount of water had come into the hole from the top of the clay after the opening winter rains. This water was pumped out and the hole was full of water again after 72 hours, there having been no further rain or visible water on the surface. This pattern was repeated, filling and emptying, over the winter with the same results. The water level reduced in November and, by December, only a very small amount of water trickled into the hole (Whittington, 1975, p19).

They could follow this pattern of subsurface drying all the way down the slope coming up to summer. However, another such hole within 300 metres of the valley floor “never became dry at any time of the year” (Whittington, 1975, p19). He observed
that the water never came up from the bottom but rather came down from the clay subsoil.

To test the validity of what he had found out, and to counter the theory that the water was coming up through the fine clay under pressure from the rising water table and accumulating in the coarse top soil, four more holes (20 cm diameter) were dug three metres down into the dry fine clay. A pipe was placed in the centre of each hole. These pipes had been modified at the base in order to seal off the water coming in from the ground around the pipe and a loose tin cap was fitted to the top. Water could only enter the pipe from underneath. The four holes were constantly monitored during the winter of 1950. Whittington found that water rose to the surface in the hole around the pipe and the level remained constant until summer. However, there was never any water inside the pipe itself. (Whittingham, 1975, p20). Thus Whittington was convinced that the water was coming from subsurface throughflows.

Where Did The Salt Come From?

In the water cycle, rain clouds are formed over the sea drawing up salt along with the moisture. These clouds are subject to various atmospheric pressures which allow them to drop their moisture over the land. Soluble salts form part of this rain and are a vital part of the minerals needed for good plant growth. As the rain goes further inland, the volume of salt reduces and thus, according to a report printed in May 1955 by Mr S T Smith, Department of Agriculture WA (quoted in Whittington, 1975, p21) the following salt levels had been measured:

- Perth: 543 milligrams of salt per litre
- Brookton: 57 milligrams of salt per litre
- Merredin: 50 milligrams of salt per litre

Whittington calculated this would work out at about 1.25 kilograms of salt per hectare for every 25 mm of rain at Brookton. With an average rainfall of 425
mm at Springhill, this would roughly approximate 21 kilograms of soluble salt per hectare per year (Whittington, 1975, p21).

Prior to clearing and in the early years of farming, this soluble or cyclic salt was part of the natural life cycle replacing salt taken from the ground by plants and was necessary to promote healthy growth. However, once this cycle was upset by changing the flow of water over the landscape, then the whole natural cycle was threatened. Whittington maintained that by clearing the land and allowing rainwater to run off in an uncontrolled manner, the soil on the slopes would not retain adequate amounts of salt required for healthy plant growth and instead, the water would carry a concentrated amount of salt to the valley floor where it became toxic and inhibited natural growth. (Whittington, 1975 p21).

To ascertain the amount of salt that existed in the soil at Springhill, he took a series of samples with the results (taken from Whittington 1975, p22) shown at the bottom of this page.

He notes that “alkaline soils would normally have between 300 and 400 parts per million of salt” (Whittington, 1975, p22).

In the world of science, theories have to be proved using accurate records of before and after, and experiments have to be carried out in such a way to ensure that the result is valid. Thus, it is important to note that Harry Whittington was very careful to ensure all his inquiries and experiments were carried out with accurate measurements and observations and adequate sampling to ensure validity. This was probably influenced by the nature of the scientific literature which he obtained to assist with his project, but also because he was anxious to ensure that his conclusions were correct and could be replicated.

He had anecdotal knowledge of the changes on Springhill from the time when it was native bush, when it was first cleared and down the ensuing years until it reached its “barely viable” state in the 1950’s. He had personally witnessed the changes in the flow and availability of fresh water, the gradual waterlogging and subsequent salinisation of the valley floor and the dramatic changes for the worse in both crop, pasture and sheep production.

From his test boring, he concluded that due to changes in vegetation and the subsequent formation of a plough-sole, fresh water recharge of the underground aquifers from rainfall on the slopes was not taking place, therefore fresh water wells had dried up and water was no longer available to vegetation during the dry months.

The eroded gullies were a direct consequence of the unimpeded run-off of surface water. The surface water ran-off the slopes fairly quickly and drained away via natural waterways. However, it did wash the “fixes” down to the flats where they contributed to blocking percolation pathways for water through the finer clay subsoil and down to the aquifers. He therefore deduced that the waterlogging was caused by sub-surface throughflows, which continuously seeped into the valley flats ensuring that it remained permanently wet or “waterlogged” (Whittington, 1975, p23 4).

These tests took place over three years and in 1951, Whittington again approached Mr Lightfoot, the Commissioner for Soil with his results and proposals for combating the erosion and waterlogging problem.

<table>
<thead>
<tr>
<th>Block Numbers</th>
<th>9459, 9157</th>
<th>5456, 5897, 4991</th>
<th>4534</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hill Top</td>
<td>240-260</td>
<td>260-280</td>
<td>20,000-70,000</td>
</tr>
<tr>
<td>Mid-slope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salt Valley</td>
<td>7cms below surface</td>
<td>200-250</td>
<td>300–500</td>
</tr>
<tr>
<td></td>
<td>300-320</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Salt content measured in parts per million.

Results of soil samples measured to ascertain the amount of salt that existed at Springhill (taken from Whittington 1975, p22).
Lightfoot continued to recommend pasture furrows and salt tolerant plants as much cheaper and more likely to succeed than Whittington’s proposals. He offered Department of Agriculture assistance with planning and installing pasture furrows which Whittington accepted

“for two reasons:

1. The Department of Agriculture would be involved;
2. Departmental officers would be able to observe the futility of furrows in this situation” (Whittington, 1975, p27).

In order to achieve the maximum effectiveness of these pasture furrows, Whittington decided to start on a

“catchment area (hill slope) which would not be influenced by run-off or throughflows from another section. It was also necessary to have an area which had a critical erosion problem including salt land encroachment” (Whittington, 1975, p27).

The eastern side of Block 5781 was thus selected and in 1952, after testing had been carried out by Whittington to ensure that the same subsurface conditions applied to this block as applied to previously tested areas on the property, the area was surveyed and planned by Mr J E Watson, a Field Adviser, Soil Conservation Service in the Department of Agriculture WA and pasture furrows installed (Whittington, 1975, p27).

The Department had loaned a special plough to create the furrows which were installed about 8 metres apart. As Whittington had assumed, after the first rain all the furrows “had washed out” (Whittington, 1975, p27). The furrows were reploughed several times over the season as they washed out after only 5mm of rain and even more topsoil was lost.

By October 1952, Whittington was convinced that furrows were not at all effective on controlling erosion or the salt encroachment problem. He determined to put his own theories into practice and with the help of a sympathetic bank manager obtained a loan. The Department agreed to assist with the planning

on Block 5781 and in 1953 Joe Watson surveyed some banks

“around the top of the hill and a grade line just beyond the timber, then a few lines across the slope of the hill for guide lines when working the paddock in the future... This was as far as the Department was prepared to go, as its officers did not agree with my ideas” (Whittington, 1975, p28).

The surveyed paddock contained 11 deep gullies ranging in depth from one to three metres, which Whittington also hoped to repair as part of his work. As there was no further assistance available from the Department, Whittington and a sympathetic friend used a bulldozer to construct the first interceptor banks.

“Neither of us had any experience and we didn’t know what we were looking for, but we thought that the ‘dozer had to cut below the plough sole” (Whittington, 1975, p28).

The Results

These first banks “did stop the downward rush of the surface run-off; they also collected a lot of topsoil, but they did not stop the seepage” (Whittington, 1975, p28). But valuable lessons had been learned.

“Interceptor banks:

1. Should be constructed as near as possible to the top of a slope, preferably above the point where water begins to congregate and form rivulets.

2. Should be spaced at intervals, that the rain falling on the area between the banks will not be of sufficient volume to develop run-off energy, powerful enough to move valuable topsoil down in the nearest bank.

3. Should be sufficiently close that the capacity of a normally constructed interceptor bank would be capable of holding the water which would fall on the area between the banks in an average rain. Where the watershed is very high, it is an economic
advantage to build additional banks of a normal capacity, rather than increase the capacity of a lesser number.

4. Should be constructed – sub-soil permitting – where the depth of topsoil is at its shallowest, provided that other requirements have been met.

5. Should be dug to a depth at least below the formation of the plough sole. It may be more effective if the build-up section was removed as well” (Whittington, 1975, p30).

Whittington’s main purpose in designing and constructing interceptor banks was to control both surface and sub-surface water run-off, preventing waterlogging on the valley flats and consequent salt-encroachment. “The longer water can be held where it falls, the more beneficial it will be” (Whittington, 1975, p30). He often quoted his father’s remark that the only way to stop the waterlogging was to build a concrete wall around the tops of the hills. Whittington used these experiences together with results from extensive soil testing and rainfall measurements to formulate a theory that for “every three metres drop in elevation, an interceptor bank should be constructed” (Whittington, 1975, p32). This would vary according to the country, sub-soil makeup, average rainfall, etc, but it was a useful guide. If the gap between banks was too large, then the efficacy of the banks was reduced.

575 millimetres of rain fell at Brookton between February and November, 1955. This was one of the wettest years on record but unlike the pasture furrows, the interceptor banks stood up to the test well and previously waterlogged and saline areas were beginning to dry out despite the rain. Having controlled the surface run-off and the throughflow, Whittington proceeded to fill gullies caused by erosion and construct interceptor banks over much of the affected land on his property.

In 1961, he designed tests to measure the amount of water being lost through surface run-off and the combination of subsurface throughflow and surface run-off (Whittington, 1975, p33). He thought that these measurements would correlate with the dramatic loss of superphosphate recorded by the
tests carried out by Cumming Smith, Mount Lyell and Farmer’s Fertiliser Co over the period 1948-1950. He constructed a grade line across Block 4991 which would discharge into the creek through the Fresh Water Reserve No 9326. The level and flow of the water was measured just before it entered the creek. He found that the “highest recording of surface run-off was nine per cent of the rainfall – nothing to be alarmed about” (Whittington, 1975, p34). However on deepening the grade line into the sub-surface clay, the flow of water which passed through the instruments was 65 per cent of the total fall of rain. This result was confirmed by further tests and provided a clear illustration of the fact that without controlling the surface run-off and sub-surface throughflows, “55-60 per cent of applied super was lost to the area and lost for production”. Superphosphate was an expensive outlay for farmers and much money was being wasted if such large quantities were simply being washed away.

By 1966, he could see considerable improvements on Springhill with previously waterlogged areas in the valley flats drying out and germinating pasture. Wattle trees and sheoaks had started to grow again in the Fresh Water Reserve. On a badly waterlogged area on Block 4534, he constructed interceptor banks across the valley flat which were dug down to 15 cms below the surface and were open at one end, delivering run-off to an old creek. By controlling the water in this fashion, the degraded topsoil was encouraged to hold enough water for germination to take place while the excess water ran away into the creek (Whittington, 1975, p36).

Whittington’s theory was that water held back by the interceptor banks would be utilised by the soil to assist with plant growth and that excess would slowly percolate down through the soil structure to recharge underground aquifers. He felt that this theory was well illustrated by the discovery in the summer of 1969/70 that water was once again seeping into the old creek in Block 4321, just as it had when he was a child. 1969 was a drought year and many farmers had to cart water for the first time. The discovery of this recharged aquifer prompted him to build a small reservoir in the creek and install a pump, which provided 13.5 kilolitres of water each day during that summer (Whittington, 1975, p36). This supply was further enhanced in 1971 by the placement of two windmills in this reservoir enabling 20.5 kilolitres to be pumped out daily – providing vital water for stock in dry summers.

In October 1972, Whittington was approached by the Department of Agriculture who were “conducting a lightning survey on the rising salt water table” (Whittington, 1975, p38) for permission to bore a test hole in the old salt area at Springhill. He had not drilled in this area for 22 years and was interested to see the results.
“After drilling through the surface soil where moisture was encountered, they drilled to a depth of eight metres in hard, dry clays. At that depth the drill encountered a very hard layer, and after persevering with it for some time, the drill broke through into the water bearing strata (underground reservoir – aquifer) at 8.5 metres. Mr Clive Malcolm who was in charge of the operation, declined to penetrate to the bottom of the aquifer as he felt that it was bottomless. After a lot of persuasion, he agreed to sink a second test hole. The equipment was moved 6.7 metres and the second hole commenced. At 2.7 metres, the hole was abandoned as it was too hard for the rotary tungsten drill to penetrate.

In the first test hole, water rose to the surface fairly rapidly, and contained 400 grains of salt per gallon. After the mud cleared from the hole, the water cleared considerably and as it flowed, the salt content lessened.

What the Departmental Salt Survey team had found was that the old underground reservoir which had gone dry some 40 years ago was now refilled with water. What in theory had been calculated could happen was now an established fact. Water was in the underground reservoir, and it could be harnessed to supply the water requirements of the farm” (Whittington, 1975, p38).

A bore hole was sunk four metres away from these test holes in 1973. The drill broke through the ceiling of the aquifer at 8.5 metres and reached the floor at 14.9 metres. Whittington suggests that the water that caused the waterlogging of the topsoil could not be connected with this underground supply as the area would not have regenerated as successfully as it had once the topsoil had been dried out (Whittington, 1975, p39). A windmill erected over this bore hole together with the other windmills effectively provided a drought-proof water supply for the property.

Whittington had sold part of the farm to finance the construction of interceptor banks over the whole property and in so doing created a profitable and well managed farm. The waterlogged and salt affected areas did show improvement and they gradually began to carry effective crops and pastures. More importantly, the salt affected areas reduced in size.

In order to best negotiate the interceptor banks, all work was done on the contour. This in turn reduced fuel costs and wear and tear on machines. Fertiliser was still part of his farm management but because the banks controlled the flow of water, they also controlled the run-off and waste of expensive fertilisers too. As a result, Whittington found that he could use less fertiliser to achieve vastly improved production results.

He experimented with minimal till methods, which maintained humus in the soil and provided a more conducive climate for the correct balance of soil animals to thrive and rehabilitate the soil. He made contact with several scientists specialising in the area of soil animals and the effects of waterlogging on plants. From them he learned of the importance of these creatures to the natural balance of the soil and incorporated this new knowledge into the whole Whittington Interceptor Bank concept. From the need to do something to save his own farm, he had created a sustainable farming technology which would benefit many others and ensured that true environmental awareness became an important feature of many farmers’ lives.

1 “throughflow” describes the movement of water close to the surface of the soil. The water percolates downslope through ‘pipes’ or channels created by deep rooting plants. Cereals are shallow rooting and would not intercept any of this throughflow thus allowing it to flow freely downslope under the surface to the valley floor.
Chapter 5: Whittington Interceptor Salt Affected Land Treatment Society (WISALTS)

During the 1970’s individuals and groups of farmers did come and look at the interceptor system at Springhill “but most seemed, were ‘fence sitters’ who came, looked and did nothing on their return to their own properties” (McGregor, 1991). Many of these ‘fence sitters’ would have had to take into consideration the cost of implementing a system for which traditional finance was difficult to access, and the active opposition of Agriculture WA (the Department).

Whittington had been particularly active in propagating his ideas in the 1970’s, addressing many farmers’ groups and assisting individual farmers who approached him for advice. One such farmer was Gavin Drew, now Vice President and Senior Field Officer of WISALTS. Drew has been an active campaigner for the Whittington methods and has kept a photographic record of the dramatic changes he has achieved on his property using this system (see case study at end of chapter).

“Expert” advice to farmers had for some time been that there was less than two per cent of land affected by salinity and it was not worth the time of the farmers or the Department in doing anything about it. The Department did not consider that it was a problem and suggested to some Quairading farmers that if they were worried about it, they should sell their land to their neighbours and that “there was plenty of land out at Hyden – salinity was not a problem” (Richards, 2000). This facile solution reflected the real ignorance of the Department about the causes of soil degradation and the effects of clearing marginal land. How much the neighbour would pay for land that was becoming unusable and where to go once the new farm had succumbed to salinity was apparently not considered.

However, these Quairading farmers were third generation on their land and did not want to just sit back and let their livelihoods be further degraded by salt. One of them, Lloyd Richards had met Harry Whittington through the Farmers’ Union and was confident that his interceptor system was worth considering as a possible solution. In 1974 Richards and Lyn Messenger gave a report on the Whittington system to the local branch of the Farmers’ Union at South Carolina, seven members of which had growing salinity problems on their properties.

The group visited Springhill to see the practical applications of the technology. Richards related that one of the first things that convinced him about Whittington’s theory of salinity being caused by surface waterlogging was the existence of an area of bare salt affected ground at Springhill. In the middle of this area was a windmill pumping out fresh, potable water, thus, for them, belying the Department’s theory, in that area at least, that the salinity problem was caused by a rising saltwater table. Combined with the history of dramatic improvements in yields and the reclamation of land from erosion and waterlogging, the seven farmers were convinced and eager to start implementing the interceptor system on their own farms.

Thomas Mills, Lloyd Richards, Laurie Adamson and four other farmers approached Whittington to spend a week on their farms to plan their systems (one day on each farm). Engaged as a “Soil and Water Conservation” consultant, he helped to survey their land, showing them how to test the soil and educating the bulldozer drivers on how to construct the banks. They worked together on each property and found this approach very instructive as it helped them to see at first hand why it was right and how it could work. This was one of the first large scale applications of the system apart from Springhill and it was carried out amid strong opposition from the Department. Richards recalls an Agriculture WA officer phoning him the day before he was to start work on his own place to try and dissuade him from going ahead (Richards, 2000). Richards was determined to install interceptor banks and invited the officer to come and spend the day with them and find out what was involved. The officer did come along and watch the process of surveying,
digging holes for soil sampling, etc and admitted that he had not understood the process or how it could work.

However, it was very difficult for department personnel to openly support the work that WISALTS was doing and, in fact, one officer who spoke publicly in support of WISALTS was subsequently sacked (Richards, McGregor, Drew, 2000).

**The Formation of WISALTS**

The initial work that these seven farmers carried out quickly showed improvements in their ability to deal with salt encroachment and waterlogging. Thomas Mills was excited about the results he had achieved and was keen to spread the message to let other farmers know there was something positive they could do to minimise their salt affected land.

In 1978, supported by Lloyd Richards and other farmers in the group, Mills called a public meeting in Quairading, which was attended by over 270 people. The meeting agreed to form a society to be called WISALTS (Whittington Interceptor Salt Affected Land Treatment Society - based on the exclamation “why salt?” coined by Robert Uphill, a farmer from Tammin). The society would act as a promoter and educator about the Whittington system. Richards was elected President, Laurie Adamson, Secretary, Thomas Mills, Field Officer and Harry Whittington, Promotions Officer.

Whittington had previously been persuaded not to seek re-election as Senior Vice President of the Farmers Union in 1978 as his supporters felt he could make a larger contribution by working through WISALTS to educate farmers and others about the urgent need for soil and water conservation.

It was decided that the best way to promote the system was to hold schools to teach farmers the principles of planning, surveying and constructing the banks and to hold field days where successful work could be examined. This education was a vital part of implementing an interceptor bank system because, if not correctly sited or constructed, the whole system would fail. The first school was held at Mullewa over five days and farmers from all over Western Australia attended. Those that came were very concerned about encroaching salinity on their properties and had already tried the ‘official’ solutions with no measurable success.

It is important to note that in the past most of the farmers that have implemented the system have done so entirely out of their own savings, as little bank finance was forthcoming for soil conservation not approved by the Department and government subsidies were not readily available.

WISALTS, along with the WA Farmers’ Federation (previously the Farmers’ Union), lobbied the Federal Government for some time for changes to the tax system to enable farmers to claim extended tax rebates for soil conservation work on their properties. A major consideration for this being that farmers with the worst affected properties are unlikely to earn sufficient taxable income to write off the total cost of conservation work in the year in which it was performed. WISALTS has suggested that tax rebates of 150% be carried over a number of years (under the five year averaging rule, for example) to enable the farmers to obtain maximum benefits from the facility and, in so doing, provide a more powerful encouragement to undertake vital conservation work on their farms. Some may see this as taxpayer funded assistance of private individuals who have made the wrong decisions in terms of land care in previous years. However, given the failure of government policy and government agencies in managing the salinity problem on land they control, it is difficult to sustain the argument that the individual farmer should be held fully accountable for the costs of rectifying the problem of land degradation. Different options of financing soil and water conservation work should be evaluated in terms of what will generate the greatest level of activity by land owners to combat the problem. A dollar for dollar grant could possibly result in a greater level of activity than a tax rebate scheme. As the farmer would be committing 50% of the funds under a dollar for dollar grant, there is a degree of self interest for the farmer to ensure the expenditure is productive and not purely cosmetic. A 150% tax rebate would result in the community refunding to the farmer $1.50 for every dollar spent by the farmer and therefore no incentive for the farmer to be concerned about the ultimate value of the work performed. A tax rebate system could possibly encourage expenditure purely for the...
purposes of the rebate and not for the actual productive value of the work performed.

While the form of assistance may be debated, there can be little argument that if the work is to be carried out on a scale that is sufficient to turn the land degradation problem around to one of improving soil and water quality, then it will be vital to provide some form of incentive to farmers. Farm budgets are usually aimed at survival for the next 12 months, with no room for implementation of long term conservation strategies.

Shortly after its inception in 1978, WISALTS had a regular membership of 1200 farming families, which had decreased to about 800 in 1991 with members from Western Australia, South Australia, Victoria, New South Wales and Queensland. Over the past few years, membership has remained steady at 300 families. At its height, there were 43 branches of the society all over the agricultural areas of Western Australia. For the first three years, WISALTS committee members and Harry Whittington held a whole week of field days, ranging from Binnu in the north to Esperance in the south. These continued over the years on a regular basis. In addition, Harry Whittington and other committee members continued to speak to other community and farming organisations both in Western Australia and the Eastern States. They travelled extensively spreading the message, at their own cost in terms of money and time spent away from their farms.

Regular field days were held over the years and, on several occasions, delegations of Rural Press representatives and politicians, accompanied by Department officers, came to have a look at the work that WISALTS was doing. Many such visits resulted in positive press coverage for WISALTS and consequent rebuttals from Department staff. This antagonism only served to entrench departmental opposition at the highest levels making it very difficult for any constructive joint research to be carried out. In addition, committee members noticed on several occasions that farmers who showed interest in implementing the system were taken aside by Department representatives or contacted later with the object of persuading them not to continue (Richards, 2000). This has also been evident at field days in recent years (Powell, 2000).

In the early days of WISALTS, Harry Whittington and Lloyd Richards met with Sir Charles Court (then Premier of Western Australia) to discuss the growing controversy between advocates of WISALTS and the Department. The Premier suggested that government scientists should be more knowledgeable in this area than farmers and that Whittington must, therefore, be wrong (Richards, 2000). Needless to say, this did nothing to dampen the enthusiasm of WISALTS members! However, Court and his Commissioner for Soils were invited to a field day on the Turner property at Brookton to judge for themselves whether or not the technology was a valid solution. The Commissioner, after inspecting the work on the property, felt that the Whittington system may have some benefits which merited further research by government agencies (Richards, 2000). However, when the Labour Government came into power soon after, the position of Commissioner for Soils was made reportable to the Director of Agriculture and it appears no such positive research was ever carried out.

WISALTS received a grant from a large farm products company to pay for a three-week trip to the USA by Lloyd Richards and Tom Mills. The purpose of the visit was to locate a machine which would install banks more efficiently than a traditional bulldozer. Richards and Mills did not find such a machine but spent the three weeks crisscrossing the USA to meet farmers and soil conservation experts, including Dr Al Black, a soil scientist and Dr Eugene (Red) Doering, a soil engineer. Black and Doering had extensive experience with soil conservation measures and were interested in the use of interceptor banks to control waterlogging and salinity. They were subsequently invited by WISALTS to visit Western Australia to study the Whittington Interceptor Bank (WIB) system and also soil conservation measures then in use in WA. Richards escorted the visitors around WA examining WISALTS and other conservation work and they also had meetings with Department representatives.

Both Doering and Black endorsed the principles of the Whittington Interceptor System in their reports. They also commented favourably on work being carried out by the Department and other farmers on intensive cropping/stocking rotations designed to increase the take-up of surface and sub-surface
water and thus reduce the possibility of waterlogging (Drew, 2000).

WISALTS members continued to stress that for them, as non scientists, the main proof that WIBs were having a positive effect on the landscape was the growth of crops and clover on areas that had previously grown nothing, and the visible drying out and ‘raising’ of waterlogged and sunken areas in valley floors. These results, combined with increased productivity, were enough to persuade farmers that interceptor banks could work and, despite the expense, many farmers went ahead with bank installations.

**Surveying the Banks**

As previously mentioned, in order to ensure that WIBs were correctly planned and constructed, and to avoid criticism of shoddy or incorrect work, the WISALTS committee drew up a strict set of guidelines covering consultants or surveyors:

- Farmer: can survey work only on his own property. Work to be checked by A Class surveyor prior to the bulldozer moving in.
- B Class Surveyor Planner: must have attended WISALTS School and have experience with A Class surveyor. Work is checked by A Class surveyor before the bulldozer moves in.
- A Class Surveyor: had graduated from B Class with experience and proven ability over a large area with different problems – has passed theoretical and practical examinations (set by WISALTS)” (Henning, 1983).

Consultants make extensive use of aerial photographs to diagnose particular problems on farms and to ensure that the WIBs are planned to account for all possible ground and soil conditions on individual properties. Whittington “was a genius” (Richards, 2000) at seeing waterlogging problems from the air and reading the landscape.

One of the most important principles when planning new bank installations is to identify the pivot points or natural landmarks, which can be used as a basis for surveying banks. These can be a group of trees on a ridge top, a natural rocky outcrop or collection

Evidence of water erosion and salt damage (photo: WISALTS).
of boulders. Whittington discovered that by using these as a reference, he could quickly identify the nearest natural ‘barrier’ to the top of the slope, and thus locate the first bank, preferably above the recharge area at the top of the hill. In this way, he was working with nature to engineer a solution, which would balance water in the soil close to what it was before clearing (Drew, 2001).

Whittington had earlier discovered the existence of these dyke-like natural barriers, which prevented the flow of water across the deeper sub-surface soil profile. By pushing a sharpened steel rod into the ground, he found that the shallowest base material was over the barrier. Recent scientific analysis has confirmed that the compaction and density on the barrier is much greater than elsewhere, which would assist with sealing an interceptor bank built directly on top of it (Drew, 2000). The barriers follow the contours of the land and, on further examination, appear to consist of silicon-like material with some iron and aluminium content. They are usually much shallower than the subsoil on either side, are very hard to break up with machinery and seem impervious to water. When a backhoe shovel strikes this barrier material, it is so hard that it causes the shovel to smoke with the effort of penetrating it.

By placing a sealed interceptor bank on top of this barrier, an environment was created in the ground above the bank where soil bacteria could exist and multiply. It has been shown that water can move upslope from the bank through capillary action and that gradually the soil bacteria can revitalise the surrounding ground. Noel Powell (2000) has described being able to measure the capillary action by simply using a probe to test the moisture and give in the soil on the uphill side of the banks. He described how the ground was hard and difficult to probe when the banks were first built, but within a very short time there was evidence that water was gradually percolating upslope above the banks. The hardpan or ploughsole on the scarp at Beermullah had broken up within four years of installing banks and the improvement in crop yield was in the order of 250 per cent (Drew, 2001). Drew notes that the problem of non-wetting soils disappeared within a few years and wind erosion on light soils was corrected through the soils being held with much denser root material.

Before any bulldozing work is undertaken, detailed plans of a bank installation have to be drawn and approved by a senior consultant who checks to ensure the proposed work is correct and will be effective. It must be stressed that every surveying situation is different and even experienced consultants sometimes come up against confusing indicators and unusual ground conditions which necessitate changes to the original plans (Drew, 2000). In addition, as many farmers who wish to construct WIBs have to deal with run-off from neighbouring properties, some banks may have to be built on a slight grade to act as drains to channel excess water to an existing waterway or creek. It is important that the grade is gradual in order to control the flow of water. Too steep a grade would result in erosion and create worse problems for both landowners. It is also possible to design an interceptor system so that it delivers excess stormwater to a dam, thus providing fresh water for the property.
HW with fence post covered by silt (Photo WISALTS): Harry Whittington indicates half of fence post showing out above the deep silt eroded from the hillside. Any furrows left on sloping ground invite erosion of soil and nutrients. Paddocks erode into gullies, creeks erode into rivers – causing silting and flooding problems all the way to the coast.

A well-constructed bank made with a small dozer. Photo: Courtesy WISALTS

Treated land, Eneabba: “A farm at Eneabba, which previously had large paddocks and valley waterlogging problems, has now changed to conservation farming. Holding water on the slopes and drying out the valley floor is resulting in increased production from balancing the available moisture all over the farm” (H Whittington).
Springhill after opening rains April-May 1988 (Photo H Whittington). Soil conservation work was carried out in this area in the 1950's. Deep rills and washouts were filled in and interceptor banks constructed. “Cultivation could be safer with all work strictly on the contour. Headland downhill furrows and unbroken end headlands can cause erosion” (H Whittington, 1988).

Untreated catchment at Quarading after cultivation, May 1988: (Photo: H Whittington). Note the erosion starting on the slopes of this untreated slope. The dam is full of silt from the fertile slopes. When planning an interceptor system it is vital to take note of where the erosion starts and plan for a safe overload system for heavy storms (H Whittington, 1988).

Crash Edwards' property at Kweda, 1996. A good example of tree planting along interceptor banks which, once established, assist in using water where it falls and in creating microclimates to protect crops between banks, further improving yields (Courtesy J Messenger) - see table of results page 56.
Innovations

It must be noted that, although Harry Whittington had been a pioneer in researching his method of soil conservation, trying out various methods before he succeeded, he was also a man with quite committed opinions and did not always accept dissension from WISALTS members with equanimity. He did, however, come to accept that certain physical situations would require amendments to the basic interceptor system.

Two important innovations have made the work of WISALTS consultants more efficient. Both innovations were introduced by Laurie Adamson, in consultation with Harry Whittington and other members. These are the use of the divining rod to ascertain the location of barriers, throughflows and static water zones and the introduction of plastic sheeting as a means of sealing banks to ensure their effectiveness.

Water divining is considered by many to be an outdated or unreliable practice in this age of high technology, infrared and satellite photography. It is, however, a very useful tool once the user has become adept at reading the signals it sends. Adamson learned how to use the ‘wire’ and applied it to the surveying of barriers and other water features by using a backhoe to dig test holes to check his findings. Divining is related to electro-magnetic impulses in the soil particles and sensitive “dowsers” (water diviners) can pick up changes in the sub-surface water flow to 100 per cent accuracy. Experienced practitioners can also detect the depth of water. This is particularly useful in sandseams as it gives the surveyor an accurate idea of how deep banks would have to be dug to eliminate sub-surface leakage. This can vary from quite shallow to depths of ten metres or more.

Adamson has written a comprehensive consultant’s handbook (2000) on the use of the ‘wire’ for assisting with on-farm planning and surveying of WIB systems. It is considered vital that all consultants learn how to use ‘the wire’ and it is WISALTS’ practice only to issue ‘tickets’ to those consultants adept at reading the signals as they walk across paddocks. Consultant’s tickets are reissued each year to ensure that only qualified surveyors are retained. Although not considered to be scientific or credible in some circles, the ‘wire’ appears to provide accurate and useful information. It is important to emphasise that WISALTS members are not averse to using modern methods, merely that the wire was one of the few accessible and affordable tools available to them at the time.

The use of plastic sheeting has been a huge breakthrough in creating sealed banks, particularly in areas of large sandseams, which are difficult to completely seal using the traditional two push method of construction with a bulldozer. Because of its effectiveness, many consultants now choose to install plastic in all banks that they survey. It makes construction more expensive but ensures that work is effective and likely to last for many years without requiring further attention.

To install plastic sheeting, a backhoe is used to dig a trench along a previously located natural barrier. It is vital to dig the trench right down to the barrier material to ensure a proper seal. All loose material is scraped from the trench and black plastic sheeting laid vertically in the trench taking care to ensure there are no holes or gaps, which would allow leaks in the completed bank. The trench is carefully filled using a bulldozer, with fill being mounded on top of the bank. A small channel the width of the bulldozer shovel is then formed on the uphill side of the bank to allow the traditional interception of surface water.

Laurie Adamson. Photo: Courtesy WISALTS.
Where the following installation was taking place at Aldersyde, the actual friable topsoil was less than half an inch thick and the paddock was bare apart from a few weeds. It was hoped that the installation of this series of banks would return the paddock to profitability. Installation of banks across a property is necessarily a gradual operation, both in terms of financial cost and availability of skilled labour. Some
farmers have purchased their own earthmoving equipment, which has helped to contain the costs of construction somewhat.

In addition to installing WIBs on farms, WISALTS has been involved in several projects to prevent flooding in country towns (Morawa); conservation work on regional wetlands (Beermullah Lake, Gingin); advising the Main Roads Department and local shires in locating and sealing throughfloods; and diverting farm run-off which has caused extensive damage to roads. Laurie Adamson has published a booklet designed to educate high school students about the interceptor bank process and raise awareness of the need for soil conservation.

Throughout the history of WISALTS, both Harry Whittington and successive presidents have conducted a constant barrage of correspondence with newspapers, government departments, scientists, politicians and anyone who may have an interest in, or power to alter, apparent government disinterest in the technology. Submissions were made to all relevant government inquiries into agricultural, water and land use problems, both state and federal. Many, as well as being active WISALTS members, have served on various representative committees for agricultural interests.

The Need for Inter-disciplinary Research

In 1983, Harry Whittington was instrumental in the setting up of the Land Management Society, which was designed as a vehicle to adequately represent the views of a range of country based organisations, with input from scientists, government and education agencies. He saw its future as a forum where farmers and scientists could work together.

However,

"It could have become a 'Clearing House' for the dissemination of information. It may have become another way of obtaining further research funding to follow through some projects that needed further investigation. Research funds may have been put to wider fields as duplication of projects could have been minimised... A place where monitoring and data recording would have been encouraged and correlated with computer filing to store for quick reference.

Somehow it hasn’t worked that way. Data recording has not really been accepted as an essential tool for good land management decisions" (Whittington, October 1993).

The Society today recommends the use of Farm Monitoring Kits as a means of assessing individual farmer management of natural resources and advises members by way of a journal and website of relevant land management articles, research and field days. However, it does not appear to have the wide-ranging research clearing house capability, which was the original objective. WISALTS has an ongoing relationship with the Land Management Society in that it encourages the use of the Farm Monitoring Kit amongst members.

One of the major problems that WISALTS has faced in trying to provide proof of the efficacy of its methods was the lack of written records. Farmers are not noted for recording information. Rather they keep it in their head. These monitoring kits, if properly maintained, will provide accurate records of farm conditions, which can be referred to when judging the merits of a WIB installation.

Gavin Drew has been a very active campaigner for soil research and although he often felt like 'the token farmer', he always made sure that his views were heard and farmers, in general, were well represented. On more than one occasion, he has presented dissenting reports where he has not been able to agree with the findings of particular committees (Drew, 2000). His particular interest, in common with other WISALTS members, has been working to persuade authorities that research must be carefully planned so that it is not duplicated and that areas such as the mechanics of the interceptor bank system, and the effects of land degradation, salinity and waterlogging on soil biology, are very valid and necessary subjects of research.

In 1989, John Loveday made a series of recommendations for future research in a paper arising as a result of a 'Soil Management for Sustainable Agriculture' workshop organised by the Research Review Committee of the Grains Section of WAFF. He suggested that a body should be set up to examine the availability of relevant inter-disciplinary research and the parameters for future research requirements. He went on to say:

"It may well be that objections will be raised that these recommendations cut across existing administrative arrangements and groupings. However, I see a strength in crisscrossing networks of scientists from the various institutions contributing their particular skills to a variety of topics. Although administratively untidy it seems necessary for progress with solutions for the many interdependent soil degrading problems besetting us" (Loveday, 1989, p30).

Unfortunately, his recommendations were not acted upon; much research is still being performed in isolation and the situation of soil degradation remains as critical today (Drew, 2000).

**The Future of WISALTS**

After a very active period of attracting publicity for WISALTS activities from its inception in 1978 through to the late 80's, the last ten years have seen the organisation gradually drop out of the spotlight. Membership has decreased as previous members having installed their banks with some success, and have gone on to contribute to other community groups. Those that remain are very committed to the goals of the organisation and continue to bring their methods to the attention of anyone who will listen. Understandably, some are a little tired of the constant rebuttals and prefer to spread the word by doing work on the ground for the steady stream of farmers who continue to ask for their help. I was given the example of recent work, where the
neighbouring farmer was so impressed that he too wanted to construct WIBs, after initially dismissing the idea. Another farmer recently contacted a consultant, desperate to try anything that would make some difference to his land (B Whittington, 2000).

In recent years the WISALTS name was changed to reflect their priority of encouraging sustainable agriculture and to take the emphasis away from salt, which is, after all, only one symptom of land degradation. The organisation is now known as the Whittington Interceptor Sustainable Agriculture Land Treatment Society.

As with many community activities, both rural and city, there is some reluctance amongst younger farmers to get involved in an organisation that would demand so much of their time. There is a small group of young farmers at Aldersyde and Kwerda who are very enthusiastic about the technology and the actual visible results that they have achieved on their properties. They are, however, a minority and feel frustrated that their fellows cannot see the possibilities. They commented that some of their peers appeared to be put off because installing banks is costly, and they were hesitant to trial the system given official scepticism and fears that it would not work on their own land. Many farmers opt instead to carry out ‘soft conservation’ such as planting trees, for which they can receive grants and government funding.

Under recent drainage regulations any sort of drainage work, whereby water is directed into an existing creek or waterway requires official approval. In practice, approvals for drainage work should be forthcoming within the 90-day notice period. But the spectre of WISALTS continues to walk the corridors of government departments and, somehow, applications are delayed or lost and relevant client farmers contacted to be persuaded not to install the system (Drew, B Whittington, 2000).

Some of the challenges which currently face WISALTS are:

- forming partnerships and maintaining lines of communication with scientists, other farming organisations and government departments;
- continuing to promote the sustainable agriculture message with an emphasis on holistic solutions;
- raising awareness of agricultural land use and soil degradation problems amongst the general public, particularly in urban areas.

Sympathetic Landcare and Catchment Groups provide some opportunities for WISALTS to extend its influence and there are signs that government officials are beginning to become aware of the need to take into account community knowledge and innovation.
FROM THE VERGE OF BANKRUPTCY TO A HOPEFUL FUTURE
A CASE STUDY

Gavin Drew had grown up in Mt Magnet on the family property. He and his wife, Sheila purchased their present property, "Warramboo", at Beermullah, north of Gingin in 1962. The farm is split in two by the Brand Highway with the eastern side on sloping country along the Darling scarp and the western part (300 ha) on flat, low lying ground situated between three large wetlands, Beermullah Lake, Blue Lane and Crane's Neck. From the highway to the further perimeter of his lowland property, there is a 25ft gradient. They hadn’t known the Gingin area well when they purchased their farm, but there was little evidence of dead or salt affected land at that time. They completed clearing of 750ha over the next few years.

1973 proved to be their best production year with 3,200 sheep and 100 beef breeders but by 1977, the sheep flock had fallen by 1000 with only 54 beef breeders. In addition, the area of salt affected and waterlogged land had increased dramatically. It soon became evident that their land acted as a sump or drain for the surrounding cleared areas.

"Between 1972 and 1977 the valley floor area collapsed and was fast going salty. Many obvious salt scalds were scattered over the area. One paddock of 83 ha was one third bare with the balance very poor pasture. Production on this area (300ha) was down by 50% overall and was deteriorating rapidly. The area was subject to severe waterlogging, part of which was under water for as much as three months of the winter. The area responded poorly to early rain and dried off before surrounding farms. In short, we were heading for bankruptcy." (Drew, 2000)

Drew had met Harry Whittington on a Farmers' Union committee and had heard him speak about his techniques on the local radio. He attended a field day at Wickepin in February 1977 and learned some of the principles of the Whittington Interceptor Bank System (WIBS). Whittington was in great demand at this time and, as Drew could not afford to wait, he undertook the installation of WIBS by himself. He would not advocate that anyone do this now as, although his banks were "fortunately... at the right places", they were "not 100% effective" (The Countryman, 9 October 1980). He attributed the poor quality construction to his inexperience and the lack of a knowledgeable dozer driver, but even so, these banks afforded a marked improvement in water control and crop production (Drew, 2002). With the advent of the WISALTS organisation, it has become an important rule that all such conservation work should only be carried out by licensed WISALTS surveyors.

Movement around the farm was initially hampered by the banks, but some well placed crossings and gates overcame this and problems with stock control were minimal. As banks were gradually installed on the contour in the hill country, this necessitated working along the contour rather than up and down. This has resulted in easier working and reduced fuel consumption.

Subsequent work has been carried out over the years to seal leaks in the original banks and the whole cleared area has been progressively treated with the WIB system. As an example of how well the banks performed, in 1980 Drew advised that the work he had completed had cost $5,600 and, that, with current production projections, the work would be debt-free by 1981 (The Countryman, 9 October 1980). Given the high price of land in the Gingin area, due to its proximity to Perth and the growing trend for sub-division for "lifestyle blocks", it would not have been economically feasible to purchase more land to replace the degraded production areas on their farm. Instead, by implementing the interceptor bank system, Drew estimates they have been able to reclaim their own land at a cost of about $12 per acre (Drew, 2000).
Drew has an extensive photographic record of his property starting from before the banks were installed and showing progress over the years to the present. The difference is especially marked on the lowland flats where winter rains are lead away in a controlled manner to a natural creek and the sub-surface throughflows are contained. Without the annual waterlogging, the sunken ground is rising again and has become productive once more. Areas that previously would grow nothing, now bear impressive crops of oats, clover and pasture. Drew states that his country now responds to the opening rains much better and hangs on much longer at the end of the season. This is very important when opening rains can be patchy and localised, often missing his property at the start of the season.

He lists the following advantages, which have occurred on his property since installing WIBs:

1. Fertiliser was being retained in the soil. Soil tests showed there were above recommended levels of phosphate and nitrogen in the soil and the levels remained constant over three annual tests despite no fertiliser being applied during this time. (In recent years, Drew has applied some nitrates to his high country but in much smaller quantities than was previously required. He applies a mixture of nitrate and sugar to minimise the harsh impact of fertiliser on the soil animals.)

2. Leaching of nutrients from other properties in the area is very high. Water samples taken on the feeder creek to Beermullah Lake early in the season have shown readings as high as 10mg/l of phosphate, 16mg/l of nitrate, 4.6mg/l nitrite and 4,000mg/l of salt, leaving little phosphate and nitrogen on the ground for crops and pastures during spring. This has not been the case on Warramboo where banks have been installed for some years. The water retained in these banks being fresh enough for stock to drink.

3. The valley floor is now being successfully cropped, where no cropping was previously possible. Sunken areas have dried out and “risen” again.

4. The natural trees, which were dying, have recovered well and now flower at the correct time of year.

5. Stock carrying capacity has increased by 30%. Currently, Drew runs approximately 2,500 sheep and 80 head of cattle. Stock are now doing very well, whereas previously they were just “surviving”.

6. There is permanent stock water in banks in almost every paddock.

7. Wind erosion which was becoming a serious problem, has been controlled wherever banks have been installed.

Given the evident success that the Drews have achieved through constructing interceptor banks on their property, they are ardent supporters of this technology. An active member of WISALTS, Gavin Drew is presently Senior Vice President and Field Officer charged with training consultants and inspecting their work to ensure it complies with the WISALTS criteria.

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1 Sandseams are areas of subsurface soil consisting of almost pure sand where water runs freely through the profile and encounters no apparent barriers. Sandseams can vary greatly in depth some being as deep as 10 metres. It is vital to seal these sandseams for the interceptor bank to be effective therefore the bottom of the sandseam must be located and the whole profile sealed with plastic.

When soil collapses or sinks, it is a symptom of being waterlogged and lacking in the aeration necessary for normal plant growth and good soil health. Under waterlogged conditions, aerobic soil animals cannot maintain good bacterial soil health. They are outnumbered by anaerobic soil animals, which assist in the decomposition of the soil profile and create harmful methane gases.
Chapter 6: The Consequences

Naturally, the success of the activities at Springhill was talked about by Whittington and other farmers interested in the concept. Some regarded Whittington as a crank in the early days.

“It’s the usual thing, when a farmer does something different from what everybody else was doing then he’s a crank…Farmers are very conservative till they gradually drive past and look over the fence to see how he’s going, then some of them started to think that this guy has got something and they started to try it out” (Conacher, 2000).

An article in The Countryman in late 1970 describing Harry Whittington’s work prompted Dr Arthur Conacher and a group of students from the University of Western Australia to visit Springhill.

Their own research work reflected Whittington’s findings about throughflow and Conacher has suggested that “recent evidence shows that the rising-groundwater-table explanation of secondary salinisation of Western Australia is an over-simplification” (Conacher, 1982). This assertion was backed up by research and interviews conducted with farmers in the York-Mawson area and later in Dalwallinu which found that there was no conclusive evidence to show that water rising from deep aquifers in these areas was causing their soil salinity problems (Conacher, 1982, p118). Conacher commented that Whittington “had come to the same conclusions as we had, only much earlier, and it was totally independent” (Conacher, 2000).

Conacher does not dismiss the “rising groundwater” theory totally as he readily admits there are areas, particularly in the wetter south west region of the state, where this may indeed be a contributing factor to secondary salinity and to the growing problem of stream salinity (Conacher, pers comm. 2000). However, the evidence that he and his co-workers obtained convinced them that throughflow was an important mechanism in the growth of dryland salinity in the Wheatbelt.

Spraying the Word

During his life, Harry Whittington played a prominent role in farming organisations, from being the local branch delegate to the Narrogin Zone of the Farmers’ Union to becoming Zone President and then President of the Coarse Grains Committee for four years. He was elected Senior Vice President of the Farmers’ Union (WA Farmers’ Federation) and was awarded Honorary Life Membership in 1988. He was very active in protecting growers’ interests.

“As a producer representative on these various bodies he never deviated from his first principal, ‘was it in the growers interest?’ As many members could attest after a vigorous debate, any who tried to trample on growers interests did so at their peril when Harry was in full flight” (J Enright, 1991).

Whittington was a WA Delegate to the Grains Council of Australia and was subsequently elected President of the Grains Council of Australia - Coarse Grains Section. He played a major role in the restructuring of the coarse grains and seeds marketing arrangements in Western Australia when the then WA Barley Board and the WA Seeds Board were combined into the present Grain Pool of WA. He was also Chairman of the Rural Water and Soil Conservation Committee.

In all of these forums, he was a committed campaigner for soil and water conservation and was often interviewed on regional ABC radio and quoted in the rural press. In so doing, he created awareness amongst farmers and other interested people of the urgent need for conservation and was able to demonstrate a system, which he had found to work on his own property. He always impressed on people the need to look for the causes of their problems rather than trying to merely alleviate the symptoms. Some have credited him as the “Father of Landcare in Western Australia” (P McGregor, 2000) as he was at one time an isolated voice working to encourage farmers and government agencies to carry out relevant research and to look outside the circle when searching for solutions to

His ideas, however, were not always appreciated and he received much criticism from the executive echelons of Agriculture WA and some Western Australian politicians. Regardless of, or perhaps spurred on by, this negativity, Harry Whittington was always happy to share his ideas with those who were interested in finding solutions to the degradation on their properties and he continued to research and refine his knowledge of soil and water conservation through contact with other farmers and scientists.

**Departmental Opposition**

It is difficult to be certain about the reasons for the apparent antagonism between Whittington and the Department with regard to his ideas for soil conservation which, when examined by a lay observer, would appear to hold some validity.

Harry Whittington was an articulate man who, having conducted extensive research both of the available literature and through practical, on-the-ground experiments on Springhill, was convinced of the efficacy of the interceptor bank approach. He had previously tried the solutions suggested by the Department but none of them had showed the level of improvement that he was seeking. He was not prepared to simply fence off salt affected areas or to walk off his farm, which was fast becoming unviable unless he could find an effective solution.

Initial opposition arose, perhaps, because he was telling the Department that their solutions didn’t work and because he had presented them with a solution, which he felt would work. At the time when Whittington was first installing his interceptor banks (1950’s), the use of any form of drainage to control salinity was not an accepted solution within the Commission for Soil Conservation. It is possible that WIBs were considered drains because of the allowance for ponding of excess water behind the bank. “Even we got told in no uncertain terms that drains would not control the salinity problem” (Williamson, CSIRO, 2000).

Much of the controversy was played out in the rural press with various articles about ‘success stories’ after farmers had constructed WIBs, together with ‘Letters to the Editor’ from all parties - farmers, politicians and Department staff - in many instances seeking to discredit the others’ opinions (see Messenger in the Pingelly Brookton Leader on next page 48).

In a newspaper report in The West Australian of 23 December 1975, Mr Clive Malcolm, “the acting officer in charge of soil research and surveys at the Agriculture Department, said the method was not recommended for general use”. The article went on to say that “it was not generally applicable in WA, though it might have benefits to certain specific farm conditions”.

Mr E N Fitzpatrick, Director of Agriculture in WA was quoted in The West Australian of 18 May 1978 as having “come out strongly against what he calls ‘black magic’ cures for salt encroachment on properties”.

Politically, suggesting that salinity was becoming a major problem was not acceptable given the State Government’s emphasis on producing large amounts of agricultural export dollars. This was not a new phenomenon. Various scientists and commentators had been warning of the devastating effects of dryland salinity since 1917, only to be ignored by economically motivated, developmentalist agricultural policies. Harry Whittington was a charismatic speaker and gained wide coverage in the rural press. In addition, he appeared to be gaining support from increasing numbers of farmers who were interested in installing WIBs to control their land degradation problems. Thus, inevitably, there was a campaign within some government circles to discredit his ideas on waterlogging and salinity.

“During the whole of my life I have lived and worked in the arena of free enterprise and have always supported the Coalition Parties of Free Enterprise. Hence I was amazed some eight years ago when the then Minister for Agriculture had an idea that if the Coalition Government could silence me from any discussion on conservation, all the Coalition Government’s problems with the Amendment

46
to the Country Water Supplies Act would be minimal.

The then Premier moved to appoint a new Commissioner of Soil Conservation who was to be responsible to him. That was a great idea and (had) a lot of merit as Government would have been making the decisions. Unfortunately the then Premier retired from being the Leader, and at the same time the Commissioner for Soil Conservation reverted back to being responsible to the Department of Agriculture. Somehow some of the Commissioner’s influence and power must have stayed with him from the Premier, as it seems that he has sufficient influence to make it very difficult for research programmes in the field of soil science and soil chemistry to attract sufficient funds to start a programme to understand the changes that occur in the soils structure as other changes occur within the soil” (Whittington, 2 November 1988).

Further:

“Recently I experienced a situation where a Department representative claimed that scientists had scientific proof that the interceptor bank system did nothing to control the salinity problem. When he was asked by the then Minister of Agriculture to explain how the improvement had occurred at a site over a period of years, as was clearly illustrated by a series of well documented photographs taken of the site being inspected over the last eleven years, the representative replied “No comment”. The Minister accepted that as final proof. No wonder we are not getting at the bottom of the question. The time has come when that proof is going to be demanded” (Whittington, 2 November 1988).

The main area of disagreement between the two parties was Whittington’s contention that waterlogging was caused by the shallow throughtflow of water from slopes onto valley floors, where the natural percolation pathways were blocked by ‘fines’, which had been washed downslope with the water. Salinity occurred because the water carried with it cyclic salt that remained on the valley floor after evaporation of surface water. This salt was necessary to normal plant growth if it remained where the water fell and only became deleterious when excess quantities were deposited in one place. In fact, it has been shown that crops can grow in soils with a fairly high salt content as long as waterlogging has not created a hardpan and subsequent aerobic/anaerobic bacteria imbalance (Drew, 2001).

While the Department acknowledged that holding the water where it fell was desirable, their explanation for most of the secondary salinity occurring in Western Australia was “rising ground water” caused by percolation of excess rainwater to the deep aquifers which in turn brought naturally occurring sub-surface salt to the surface under pressure.

“Throughout my visit in Western Australia, the expression “rising water table” was frequently used in conjunction with soil salinity and salt scalds. Even though the expression is descriptive of changes in a soil-water condition with time, I soon realised that “rising water table” was being used in a very restrictive sense to mean only vertical flow from below. The expression “rising water table” applies to any set of circumstances which cause the water table in a soil to rise over time, ie, to rise because water accumulates in the soil profile. That accumulation can result from overland flow, shallow lateral flow, and/or vertical flow from an underlying artesian aquifer. I was shown a number of sites where deep piezometers showed artesian pressure beneath an apparent aquiclude. It appeared to me, however, that the volume of upward flowing water would be insignificant compared to the volume of water that could flow laterally to the waterlogged area” (E J Doering, April 1984).

Anecdotal evidence suggests that in the past officially commissioned “salinity experts”, having initially commented that Whittington’s ideas merited further enquiry, have recommended experimental programmes be abruptly terminated without allowing adequate time to properly measure the effectiveness of either WIBs or departmental solutions. This could be interpreted as, either, the relevant department having what they considered as adequate scientific evidence that the technology did not work, or,
Sr.—Recent letters, articles and press releases relating to salt land reclamation have prompted me to comment on some of the supposed facts and present the true picture as I see it.

The letter and figures of Mr. T. Negus in the May 25 issue of "The Countryman" reinforce the ineffectiveness of the Department's advocated ideas, while he is to be congratulated for his last presentation figures and photographic proof of same. This monitoring is not on Whittington's interceptor banks and is not relevant and is not to be construed as such.

Mr. Old (May 11) thought the banks were costly and the Department's ideas were as effective and less costly. Both the effectiveness and cost as indicated are definitely wrong. Interceptor banks cost (1976) approx $3.70 per ha based on the operator and the Department's costings (Salt Land Management, 1976 Bulletin): Hillside seepage, $1.20 ha; Valley water logging saltland, Main creek cleaning, $0.50 per km; W drains (grader built) $50 km; Grassing and fencing further $1.15 per ha.

Mr. Old's Department advocated ideas aren't in the race especially when they are ineffectual.

I was the first to follow Mr. Whittington's lead and in 1971 had some banks put in and was asked by Mr. Negus on behalf of the Department of Agriculture to monitor and to prove them right or wrong. He has pointed out that clover fails at 0.05 per cent and wheat fails at 0.2 per cent sodium chloride.

It is interesting to analyze the Department's figures from six testing sites. Sites 1, 2, and 3, with their highest readings were 31 per cent, 16 per cent and 23 per cent respectively and had clover growing. And in 1971 a crop of oats was planted around these areas: 22 acres which yielded 75 bushels per acre. Previously the best this land had ever produced was 18 bushels per acre, and in fact, one year in the early 60's—a wet year—the crop was a total failure. In July, 1973, we had 440 points of rain and normally would have failed also, but the complete reverse was the case. This was sown with only 90 lbs of super per acre. In 1974 oats were sown again and being a dry year, it yielded 54 bushels.


Previous return valued at $1 bushel (18) $5.96

1973 return valued at $1 per bushel (75) $150. Increase of $115.4.

1976 return valued at $1 per bushel (34) $1188. Increase of $729.

It would appear that once you control seepage and logging the water rainfall years are of benefit, whereas the uncontrolled or advocated ideas in years of excess wet are disastrous.

The bare salt patch around sites 4, 5 and 6 is half the size now to when started.

Our figures do appear considerably higher as compared with the figures of Mr. J. Ward (Mr. Negus's figures) and perhaps the percentage of sodium chloride shouldn't be used as the measurement of success or failure, but a measurement of soil aeration, field capacity of water in soil, soil micro-organisms and crop and pasture production, would be more relevant.

I am convinced after using the advocated ideas for some years that the Department is only treating the symptoms and not the cause. Sodium chloride is the end result of evaporation of water-logging.

Mr. Negus hasn't shown any interest in the sites since August, 1972, when fertility started to improve, but has started monitoring D. Bond's site which I set up in April, 1976, and it will be interesting to see if the Department maintains that interest when similar results are obtained.

Yours etc.—

LYN MESSINGER
Brookton (Phone 096 421021).

Editor's Note: We regret that a color photograph of the 75 bushel crop of Swan Oats grown in the 1973-74 season is not suitable for reproduction.
conversely, a political reaction to discontinue research that may have proved their opposition to be misplaced. Many WISALTS members believe the latter to be the case.

One such example is that of the Batalling Creek trial. After a Land Use Seminar held in Bunbury in October 1975 at which speakers from various government departments spoke on the main theme of future water supplies for the metropolitan area, Whittington came away convinced that the government would be pressured to stop clearing in important catchment areas and recommend reafforestation. He reported this to the Executive of the Farmers’ Union who asked Whittington to draft a letter advising the Premier that stopping clearing in the Wellington Catchment Area would do little to stop the growing salinity problem. However, after consultation with the Director of Agriculture, the letter was not sent because it was felt that “all the experts knew that I was wrong” (Whittington, February 1979).

In 1978 the Government proceeded to introduce and pass the Country Areas Water Supply Act Amendment Act which prevented further clearing in the Denmark, Kent, Warren and Wellington catchment areas in an effort to reduce salinity in rivers in the south west of the state. This clearing ban had, understandably, not been well received by farmers, many of whom had a programme of clearing under way which they felt would ultimately provide profitability for their properties. The farmers were becoming aware of the salinity problem but were also keenly aware of their need for cleared land for agriculture.

Whittington felt that it was too late simply just to reafforest affected areas as it would take many years before any appreciable difference, if any, would be recorded. He again reiterated his contention that simply attacking the symptoms—planting trees on degraded land—would not be effective and that more effort should be made to ascertain the causes. He advocated research into the benefits of an interceptor system in holding the water where it fell and the resulting beneficial effect this had on soil animals, producing an aerobic effect on the degraded soil; thus gradually rehabilitating it and reducing run-off of both water and toxic chemicals into the river systems.

Mr Ray McPharlin MLA supported the WIB system and in 1977 had pressed the Minister to allow a trial of Whittington’s technology. In 1978 at the time of the clearing ban controversy, Whittington was approached by the Public Works Department (PWD) with the object of establishing a trial using WIBs in a catchment to the Wellington Dam “to show how the water quality could be improved and the quantity increased. At that time, only five per cent of the rain that fell on the catchment made its way into the Wellington Dam” (Whittington, 1999).

After protracted discussions with PWD representatives and a change of minister, Mr W McPharlin MLA approached the new Minister, Ray O’Connor and some funding ($10,000) was made available by the Government to finance the trial. A suitable area, was chosen along Batalling Creek, which flowed into a tributary of the Collie River near Wellington Dam. The catchment was largely cleared and the valley floor was sunken and waterlogged with the creek discharging highly saline water. The trial was scheduled to last five years to establish whether the WIBs caused any measurable changes in the volume of fresh water reaching the creek. The PWD had been monitoring this site for several years and already had a database of flowrates and salinity levels of water passing through the gauging station in the creek. However, the validity of the data was open to question as the gauging machine had to be recalibrated prior to the trial.
“We were in fact starting with no pre-trial data, but it was agreed by all that the seriousness of the Wellington Weir did not justify holding up the test for two years to obtain the trend of change in the water quality” (Whittington, 1984).

“By taking samples of water from the soil of the valley floor and up the slope, it became evident that the salts which were causing such much concern were being picked up by the water in the last 150 to 200 metres from the creek. Within a few metres upslope from the valley floor the water had normal levels of salt. But in the area adjacent to the valley floor, that area defined as the static water zone, high concentrations of saline water were waiting to be carried into the creek. This was found to be occurring on both sides of the valley” (Whittington, 1984).

The trial was to be carried out on only a small area of the catchment due to the expense of treating the whole area. Preparatory drilling, testing and planning were carried out in early January 1978. The interceptor banks were surveyed and constructed on the natural barriers by the end of that month by Whittington and other WISALTS members at a cost of $2,000 (being the bulldozing component of the installation). This system was designed on a grade to carry water from hillside throughflows and surface flows in a controlled manner down to the creek bypassing the heavily saline area in the valley floor. It was, in fact, a water harvesting system rather than a true interceptor system, which is designed to hold water where it falls. A mini-gauging system was installed in the interceptor drain.

In May 1978, Whittington inspected the site with officers of the PWD and pointed out that the piezometers were measuring water coming down the creek rather than the water that was supposed to be coming from the rising ground water. The previously agreed on soil testing had not been carried out to ascertain soil zoology because “it was evidently considered of no concern” and too expensive (Whittington, 1994). In addition, no test holes had been installed in the experimental area. Test bore holes and piezometers were later installed by the PWD in February 1979, but it was too late to accurately measure the changes which had taken place in the area in the 13 months since the interceptor banks had been installed (Whittington, May 1979).

Despite these reservations, Whittington was reasonably happy with the trial over the first year as he felt they would achieve

“a set of figures which would show certain changes, this would continue for at least five years when a pattern of changes would have been established” (Whittington, 1984).

and was satisfied that the PWD officers had carried out available data recording in an efficient manner. However,

“watching the news on television one evening in May 1979, I was rather stunned to hear Hon G C McKinnon, release a press report on the Batalling Creek trial, and further shocked when he announced the conclusions that had been derived from the 12 months study. The following day I read the report in the West Australian” (Whittington, 1984).

Whittington felt that the data obtained had been misinterpreted with a continued emphasis on salinity coming up from the groundwater under pressure. He had never advocated the interceptor system installed at Batalling Creek as a solution to salinity but, rather, as a method of harvesting fresh water and increasing the fresh water flow to the creek, bypassing the waterlogged saline area in the valley floor.

Whittington interpreted the data, collected by the PWD, to show that the banks were indeed working to control the water and, if extrapolated across the whole catchment, showed that the interceptor system would have increased the flow of water to the Wellington Weir by 94 per cent, with a corresponding 93 per cent decrease in salinity of the controlled water.

“There was no data collected at the Batalling Creek which proved that ground water was coming to the surface. The data showed that surface and subsurface water was being lost in the valley floor” (Whittington, 1984).
On an inspection visit to the site in April 1979, Whittington noticed that there was still water laying on the surface of the area outside the experimental area but within the test site, the water table was one metre below the surface. In addition the trees in the test area had

“started to put out fresh new foliage, while the trees outside the experimental area are continuing to lose their foliage. It is now apparent to me that it is not the water coming up through the hard pan which is causing the trouble, it is the water trapped between the surface and the impermeable hardpan which is causing the trouble” (Whittington, 1979).

Mr Mick Gayfer, MLA, however, was of the opinion that

“the trend substantiates the theory that the Whittington interceptor bank system will not be a solution to the problem. It is not working. … The fact that 900 farmers have carried out experiments with the interceptor bank system on their farms does not necessarily mean the system is right. The appropriate authority is the Department of Agriculture. Its officers are scientists and they have studied the problem not only in Australia but worldwide. They are trained in this field” (Hansard, 1979).

The government commissioned Professor John Holmes, a soil scientist from Adelaide University, to review the Batalling Creek trial. Accompanied by Whittington, PWD and Agriculture Department Officers, he spent three days visiting various sites around the Brookton and Quairading area where WIBs had been installed as well as the Batalling Creek site. He was apparently quite puzzled to find fresh water in a drain through the middle of a salt scald, as he considered that it should have been contaminated by the “rising salt water table”. However, in his report to the Government in September 1979, Professor Holmes recommended that the trial be terminated forthwith as there was no evidence that the Whittington system was effective and no useful purpose would be served by continuing it (Whittington, 1984).

Conacher was critical of the findings of the Holmes’ Report and questioned whether three days was adequate to make an informed judgement on the adequacy of the technology or otherwise. He felt that the report had used “misleading theoretical modelling of the situation” and had in some cases “modified facts to fit the theory” (Conacher, 1979). There was apparently little credence given to the fact that a significant number of farmers had successfully implemented WIB systems on their farms and, also, to the existing research which showed throughflow to be an important contributor to waterlogging and salinity (Conacher, 1979).

He commented that:

“The most important point is that a researcher’s mode of thinking (or paradigm) may be subconsciously very strongly, and erroneously, influenced by the selected means of data analysis and presentation. Moreover if the model fails to match the real land surface then the model must be modified or abandoned, not reality” (Conacher, 1980).

Whittington and his fellow WISALTS members were incensed that this five year trial would be terminated after only two seasons, especially given that adequate measuring in the actual trial site had only been implemented some months after the trial started. Lloyd Richards, President of WISALTS approached the Minister for Public Works and Water Supplies, Hon G C McKinnon for permission to install more banks at the Batalling Creek site to further control the water salinity problems there. This permission was granted and the banks were installed, initially at WISALTS’ expense, with the government promising to pay for the work if salinity levels could be reduced to a particularly low level. The work was carried out by about 40 members and local farmers in November 1979, bulldozers having been made available by local contractors and a mining company. The wet conditions made totally sealing the banks difficult, but in spite of this the resulting changes in water and soil quality were encouraging. Some monitoring continued until 1980 when the trial was physically terminated by the government and the monitoring equipment removed. It would be of great interest to visit this area now to see what effect the banks have had over the last 20 years.
The Batalling Creek experiment was never allowed to become a public success for WISALTS. Whittington had acknowledged that although some areas of the original bank were imperfectly sealed due to the urgency with which they were constructed and the quality of the soil, there were still noticeable results being produced, which showed the system had made some difference. He felt that

"the Public Works Department had a preconceived theory on what caused the problem, and as they had the ear of the Minister, they had persuaded him to rush the Country Water Supplies Act Amendment Bill through the house, quickly and secretly" (Whittington, February 1979).

and later

"I do not object to having my theories questioned, or the results examined, this is in my opinion the way it should be done. Why doesn't the government examine the results of its departments with the same critical scrutiny?

Whenever I have been to inspect areas where a tree and grass planting project has been open for inspection, and have asked for measurable changes to be demonstrated, I have been told that it will take more than 40 years to obtain a measurable change. But after 50 years research, we cannot be shown any areas where trees have survived anywhere near that period of time.

At the Batalling Creek Trial and Dan Keast’s, reports claimed that the interceptor system had no effect on the salt problem when they did not regenerate trees, produce crops and grasses in 12 months” (Whittington, November 1981).

The trial at Dan Keast’s property at Dangin was another example of differences in interpretation between Whittington and the Department of Agriculture. It was agreed to set up this trial on a sloping area of the property close to the Dorakin Well. Agriculture Department officers chose this area of approximately 70 hectares because they felt it would best illustrate the efficacies of the various treatments and prove that the salinity problem was caused by rising groundwater. Interceptor banks were installed on one side of the experimental area with the salt area left untreated so that ultimately its ability to grow a normal crop would be demonstrated, whilst the Agriculture Department site had some contour banks installed and salt-resistant grasses and plants sown in the salt scald on their half of the area. The saline area in the Department’s site was fenced off to prevent grazing from stock. Both areas would be managed in exactly the same way by Mr Keast over a five-year period between 1977 and 1981.

Exchanges of letters between the various parties describe a request from the Department to change the sites because the original site was on one catchment and not separate sub-catchments as previously thought. However, Whittington felt that the substitute sites offered would not provide the required conditions to accurately assess differences in performance and the original site was retained. Further disagreements arose because the Department could not see the value of carrying out detailed counts of soil animals as they

"claim these would be the effect of the changed conditions such as waterlogging and salinity, but would not be causing the waterlogging or salinity. It is their contention that a great deal of information would be gathered with no chance of it having any useful meaning, and most of it would be the result of a micro environment which may be no different from many macro environments on normal soils in certain seasons” (Olv, 1978).

An important part of Whittington’s theory was based on the role of soil animals in rehabilitating degraded soil. He felt that this research was important and would have shown what was happening to the soil in the test area in terms of aerobic and anaerobic activity. Many of these changes would not be immediately visible to the naked eye but could signal improvements in soil condition and its subsequent ability to carry crops successfully.

The official recorded result of the Keast trial in 1981 was that the interceptor bank system had shown "no measurable effect on salinity and waterlogging. Equally the Departmental methods were ineffective
in stopping salinity” (Whittington, 18 June 1985). There were some leaks in the WIBs, which were later corrected. However, the most telling result was that, although the WISALTS area had shown little visible improvement in terms of plant growth, waterlogging had been controlled and the saline area had stabilised. On the other hand, the saline area on the Department’s site had increased in size and the fence had had to be moved.

The Department held an open field day at the Keast trial site with international visitors and other interested parties present. The Department Officer responsible for the experiment gave a prepared report. Whittington maintained that he had never had any discussion with this officer about his report or his conclusions due to the officer’s prolonged absence.

“The establishment of salt tolerant forages is very different from the restoration to normal crop and pasture production. The experiment was a failure in my opinion, because neither objective was satisfactorily achieved. Further, the systems were not instrumented sufficiently to evaluate the groundwater flow systems (shallow and deep) and the performance of either of the bank systems” (Doering, 1984).

The extent to which these trials were politically motivated is open to question. They may have been an attempt to show that Whittington’s theories were incorrect at a time when he was receiving regular coverage in the rural newspapers, both in terms of the success of the interceptor system as a solution to waterlogging on farms and, also, his criticism of the clearing bans imposed in the Warren, Kent and Denmark River catchments under the amendments to the Country Water Supplies Act. Certainly many of the communication problems between the parties and the lack of appropriate monitoring in trial situations appear to indicate this might be the case.

Whittington had never dismissed the idea of planting trees as part of the solution to the problem but he was convinced this should be done in conjunction with some form of water control. He was supported in this idea by E J Doering, a Supervisory Agricultural Engineer from the Northern Great Plains Research Centre, USA who, after a study visit to Western Australia, wrote:

“Many of the soils on upper landscape positions have low water-storage capacities because of coarse soil texture and/or limited soil thickness. Areas in which the combination of coarse texture and soil thinness is so severe that the probability of crop success is low should be returned to trees or other perennial vegetation if at all possible. Perennial plants can significantly reduce groundwater recharge from such areas.
Planting trees at the discharge site to intercept the water flowing to the discharge site is a very questionable practice, however, unless the flowing water is non-saline. Trees withdraw large amounts of water from the soil and can be thought of as pumps that move soil water to the atmosphere. The problem is that the salts in the groundwater are left behind in the soil either to be accumulated until the soil becomes too saline for plant growth or to percolate slowly onward to accumulate at some lower landscape position. Thus the apparent short-term benefit is really on a transfer of a present problem to some other place or time" (Doering, 1984).

Doering supported the WIB technology because he felt that the banks were deep enough to hold the water where it fell and prevent significant throughflows. He commented that where such banks had failed, it was probably a case of failing to locate and properly seal sandseams or other geophysical conditions (Doering, 1984).

It appears that much of the Department’s criticism of WIBs was based on areas where such failures have been apparent. Harry Whittington and WISALTS have always stressed the importance of having a WIB system properly surveyed and installed by a qualified ‘consultant’. During the period of high publicity about the WIB system, it appeared that some bulldozing contractors, not certified as consultants, installed ‘banks’, which were not true interceptor banks and were either incorrectly located or constructed, or both. In these situations, many farmers felt they had spent enough money on the initial bulldozing and were not willing or financially able to pay for corrections to this work by qualified consultants (Drew, 2000; McGregor, 2000).

WISALTS was keenly aware of this problem and publicly advertised that only interceptor banks which had been surveyed by a qualified ‘B’ class consultant (and subsequently checked by an ‘A’ class consultant prior to the work going ahead) could be considered a true Whittington Interceptor Bank system. In addition, any farmer who wished to install WIBs on their property had to become a member of WISALTS. It was vital that the holistic programme of caring for the soil animals, working on the contour, and correct bank construction was followed to achieve any form of success (Drew, 2000).

The Department carried out research on a bank installation at Lex Hardie’s property near Narrogin in 1985. Mr Hardie was President of WISALTS for some years and welcomed an opportunity to work more closely with the Department as a means of improving communication between the two groups. The subsequent paper (McFarlane et al, 1990) suggests that because level WIBs can store water in the channel behind the bank, this may greatly increase recharge of deep ground water and increase salinity. The report agreed that this might also be the case with the “level and absorption banks recommended by the Department of Agriculture” (McFarlane et al, 1990).

Whittington had always maintained that the water trapped by WIBs may ultimately recharge groundwater but he disagreed with the ‘rising water table’ theory of salinity. He felt he had proved on his property and others that recharged deep groundwater aquifers contained fresh water (Whittington, 1975). The reported research carried out at Lex Hardie’s property has, however, been used by opponents to explain why WIBs are not the answer (Drew, 2000).

The Department had also carried out testing of the effectiveness of WIBs on several other properties, but these are rarely quoted. Lyn Messenger’s farm at Brookton was one such property, where testing began in 1971 but was curtailed in 1973 when, according to Mr Messenger, “fertility started to improve” (Messenger, 1978). Messenger questioned the Department’s continued opposition given that he had achieved record yields on ground that was previously badly degraded. Ensuing correspondence (p. 48) gives a taste of many such exchanges carried out in the rural press.

One of the other factors which the Department often quoted in their arguments against WIBs was the high cost of using a bulldozer instead of a grader to construct the banks as well as the loss of land available to cropping. Costs were estimated by Lyn Messenger at approximately $24.70 per hectare for WIBs in 1978, as opposed to
"the Department's costings (Salt Land Management 1973 Bulletin): Hillside seepage $126 ha; Valley water logging saltland: Main creek cleaning $500 per km; W drains (grader built) $50 km; Grassing and fencing a further $115 per ha" (Messenger, 1978).

The cost of constructing WIBs would have increased somewhat in later years with the introduction of plastic sheeting to ensure the banks were completely sealed. However, given the major improvements gained on previously marginal land, the cost would still be considered worthwhile by many.

Loss of land available to cropping and pasture was a factor to be considered, but when compared with the vastly improved pasture quality and larger yields obtained on WIB treated properties, the figures greatly outweighed the loss of a small area of land for the bank. In addition, WIBs forced farmers to work on the contour rather than up and down their paddocks, creating large savings in fuel and machinery upkeep costs.

In conclusion, Conacher succinctly summarised the situation that had grown up between farmers, WISALTS and government agencies as follows:

"There already exists in the Wheatbelt a very large group of farmers who do not need persuading that something needs to be done about salt - unlike the difficulties faced by Agricultural Extension Officers in trying to encourage farmers to practise soil conservation methods (which, of course, comprehensive interceptors also achieve).

In view of the seriousness of land and water salinity problems in Western Australia, it is therefore extremely unfortunate that a serious conflict now exists between the farmers and those government agencies which are most directly involved. The reasons for the conflict include: long term and widespread disillusionment with the advice given on salt-tolerant plants (these cannot halt the spread of salt land), catchment clearing bans, disagreements over compensation, continuation of bauxite mining and forest clear-felling in present and future water supply catchments (while these activities do not result in permanent forest removal as does clearing for agriculture, their continuation is nevertheless seen by farmers as being hypocritical under the circumstances), personality clashes, and attitudes. Some public servants regard WISALTS with deep suspicion and as appropriating what they perceive as being properly an agency role; the farmers on the other hand see the public servants as being ignorant of the problem at the farm level and as having a commitment to the institutions rather than to the public. There is a lack of trust on both sides.

Those servants of the public who will have the task of implementing whatever solutions are eventually agreed upon for the salt problem, must work with WISALTS and other members of the farming community. Without farmer cooperation any land management strategy will be doomed to failure before it can start. A great deal of constructive thought and effort will be required before the necessary harmonious relations can be restored" (Conacher, 1980).

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**An Oasis of Green, Healthy Trees in the Wheatbelt**

Mr "Crash" Edwards, an Aldersyde farmer, was an early exponent of the interceptor bank system and converted his whole farm to this technology. He planted trees along the banks, which, once matured, afforded valuable shade for stock and created microclimates between the banks. Some of his early banks may not have been perfectly sealed but the trees acted as a further barrier to retain the throughflows. There is evidence of some leaks which need to be repaired.

His farm stands out from his neighbours, today, by the rows and rows of flourishing mature trees. He has kept some productivity records which reveal a continued improvement in yields over the period recorded (see page 58). He was so sure of the effectiveness of the system that when he purchased a nearby property, he immediately installed an interceptor bank system with hundreds of trees on it.

Neighbouring farmers have advised that his property has been one of the most productive in the area in recent years, even after a difficult season (Powell, 2002).

See photos on Page 37.
Crash and Beryl Edwards of Kweda keep records Below are production figures for nine of their paddocks which have had Whittington Interceptor Bank Systems installed since 1978. The figures speak for themselves: future conservation work can be financed from increased productivity!

<table>
<thead>
<tr>
<th>Year</th>
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<td>B 0.80</td>
<td>P</td>
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**KEY:**
- **P** = Pasture
- **W** = Wheat
- **B** = Barley
- **L** = Lupins
- **O** = Oats

- **DSE** = Dry Sheep Equivalent
- **Yield** is shown in tonnes per hectare
- **N/A** = not available

*1988 Yields were reduced by at least 40% because of frost damage.
Chapter 7: Conclusions

This book has presented a history of the development of an engineering solution to dryland salinity in Western Australia. Chapter 2 briefly set out some background to ‘the salinity crisis’, with evidence of developmentalism on the part of various state governments over the past 100 years. This was despite scientists and other experts warning of possible difficulties due to poor soil quality, lack of fresh water and the financial stresses of farming marginal land. Environmentalists have become more vocal in the past 20 years. Chapter 3 discusses the emergence of community science as a viable and important adjunct to the work of traditional scientists and stresses the value of incorporating knowledge gained through experience on the ground in any solution to environmental problems.

It is evident from the preceding chapters that many farmers and scientists are still confused about the best way to face the problems of waterlogging and subsequent dryland salinity. Harry Whittington and WISALTS faced considerable criticism and political pressure when they stood up to be counted with a demonstrable solution. They represent community science at its best - farmers searching for their own solutions and then showing others what they have achieved through research and experimentation.

Some may feel this book is one-sided, but this is an important story and one that needed to be written from the perspective of Harry Whittington and WISALTS. They have made a huge contribution to the recognition of the need for greater environmental awareness and sustainable farming methods to ensure the future viability of degraded country. The holistic farming system that they advocate emphasises the need to be eccentric - providing an environment where farmers can work alongside natural processes to maintain fertile and useful land.

Harry Whittington finally received some well deserved official recognition when he was awarded the Order of Australia in 1992 for his work in highlighting the need for conservation and improved farming practices in Western Australia and for services to his local Brookton community. While this was an important honour, I feel he would have found more personal satisfaction had his ideas been given the official attention that they deserved 20 years before so that the land was actively being regenerated and further degradation prevented. His wife, Lal, was a constant companion and supporter especially during the times when he may have felt he was losing the battle to save Springhill and in his fight to bring the interceptor bank technology to the general notice.

It is important to emphasise that there is no single solution to the land degradation problems faced in Australia. The Interceptor Bank System is an effective technology which in partnership with other sustainable agricultural practices, such as well planned tree planting and stock and crop rotation, would appear to have a great chance of success. The major benefit of this system is that it aims to retain the water where it falls for the healthy maintenance of soil animals and crop production levels.

All proposed solutions must be carefully examined to ensure that what may appear to work in a particular situation, is not causing problems further down the environmental chain. Deep drains have been advocated by some farmers, who have effectively drained their own land. However, removing such large quantities of water must be carefully assessed to ensure that its onward delivery does not damage neighbouring environments through increased stream salinity and erosion, for example.

The interceptor bank system is an evolving technology and one that struck a chord with normally conservative farmers dissatisfied with the lack of other feasible solutions. Most of the work of WISALTS members on disseminating information at field days and in conducting research trials of their system with the Department has been done on a voluntary basis with contributions of large amounts of time and personal financial cost.

Most of the discussion has centred on the past. Harry Whittington passed away in October 1999, mourned by many as a committed and outspoken conservationist. Right up until his death, he was speaking to various farmer groups, addressing
seminars and writing another barrage of letters to politicians and newspapers. Whittington was continually frustrated by the apparent inability of government experts to propose effective solutions that treated the causes of land degradation rather than just trying to ameliorate the symptoms. He was convinced that by making the case for his interceptor system and, equally importantly, the need for more interdisciplinary research, an effective way of dealing with waterlogging and dryland salinity could be quickly found and put into practice. As he mentioned in the conclusion to his book, he was sure that much of the vital information was already available in some research file or other, and all that was needed was an official recognition of the need to correlate all of these findings.

I was struck by the level of frustration felt by WISALTS people about the official opposition to their views. It is clear from examination of Harry Whittington’s records and other quite separate accounts, that their feelings of frustration and sometimes victimisation were often well founded and echoed by other ‘fringe’ groups in the agricultural community. There appears to be a history of personality clashes with senior government officials, which may have prevented much of this excellent research from being acknowledged and built on in a positive manner. It has been noted that some departmental officers were supportive of the technology over the years (B Whittington, 2000, McGregor, 2000), but they were, at times, actively discouraged from voicing official support.

It is ironic that although Whittington and his WISALTS colleagues have faced continuous criticism for the interceptor bank solution that they promoted, many of these farmers have otherwise excellent relationships with officers from the Department of Agriculture. Several have participated in official trials and experiments in areas other than dryland salinity, such as raised seed beds and various stock improvement programmes and committees. Brian Whittington (2000) has praised the excellent Prograze programme developed by the Department which encourages quick rotations of stock and crops to ensure the most efficient use of land and increased use of available water.

In support of the Department, it must be noted that they have a small staff of officers to cover a huge state and their programmes are subject to strict budgetary considerations. The tendency to short term contracts does little to ensure a sense of security of employment and can also lead to a turnover of staff from one region to another, with consequent disruptions to existing programmes.

In addition, it would appear that there has been a shortage of hydrologists and other technical staff adequately trained to work in the area of soil research (Select Committee, 1990). It has been suggested that the universities should consider changing the courses they offer to more closely reflect the actual needs of the agricultural industry, with particular emphasis on soil science as this should be the basis for all work with the land. Science and effective land practices are continuously evolving on the ground and it is vital that academics stay abreast of these changes. It is of little use to produce graduates who have studied outdated material and who are, thus, not adequately prepared to deal with the challenges that face farmers in the real world.

Government sponsored Landcare or Catchment Groups have raised community awareness but are often hampered by their ‘top-down’ orientation, which may inhibit lay members and result in even more frustration with the system. Many rural people have commented that too much money is spent on research papers and committee administration, with too little being applied to the affected ground. Peter Martin (1997) describes the situation as a form of power struggle; the state has difficulty giving up or handing over power to the community and the community, in consequence, resents what they see as an abuse of power by the state. Rather than being the empowerment model that the community thinks it wants and the state thinks it is providing, Landcare could be seen as a form of state-run persuasion to encourage the ‘community’ to perform conservation work in a particular manner. It is thus yet another example of “the tendency towards the regulation of everyday life” (Martin, 1997, p47).

It is interesting to note that in state-wide surveys of Landcare group activities (cited in Campbell, 1997), the most significant problem cited by most groups in each state was weeds. However, the major activities reported by the same groups related to revegetation and fencing “for which government funds are more readily available, suggesting
government funding priorities had driven much of the on-ground activity of the groups” (Campbell, 1997, p194, Curtis et al, 1994a; 1994b; 1994c; 1994d; Curtis, 1995). As a consequence of this power structure, other ideas and solutions, such as the Whittington Interceptor System, were automatically prevented from being considered in a balanced way.

If Landcare and Catchment groups can operate with the balance of power weighted towards an effective combination of local expert farmers/conservationists with official representation limited to ensuring financial accountability and preventing duplication, then there would appear to be an opportunity for such groups to achieve a great deal in improving their local environment. The Avon Working Group has a good record for accountability and results and could be used as a model to show how an effective and well organised community science group should operate in the area of land and water degradation.

The future of Whittington Interceptor Banks appears to lie with the tenacity of WISALTS members, which include a small group of young farmers who have embraced the ideas. Perhaps they will gain as much or more by going “through the backdoor” (B Whittington, 2000), treading carefully via Landcare and Catchment Groups to gain acceptance for Harry Whittington’s ideas on sustainable agriculture.

There appears to be a softening in the attitudes of some scientists and experts who recognise the need to listen to others from outside traditional government networks who have meaningful input to make to the sustainable agriculture discussion. This is a very promising development, which it is hoped will be encouraged. However, economic rationalism still prevails and they face an uphill battle in obtaining funding for what should have been conducted many years ago - a neutral, properly documented and designed study of WISALTS methods. A study that is given adequate time to show improvements - be it five years or 50 - as only by doing this can it be proved once and for all whether the WISALTS way is the right way.

Until such a study has been done and the technology proven to be part of a viable solution, many farmers who are struggling financially will still opt for the cheaper but less effective option of planting trees and salt resistant plants, and Western Australia will still be losing ‘football fields’ worth of salt affected land every day!
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Sally Paulin grew up on a dairy farm in Somerset, UK, and it was there that she first gained a connection to the land with fields called Hanging Ground, Seven Acres and the Vicar's Orchard - all with a history to tell both of her family and the village which surrounded the farm.

All through her life she has sought to recreate the sense of community of which she was a part growing up and which she sees as vital to the future of society, both in the city and the bush.

Sally settled in Perth in 1984 with her own family and has maintained her interest in 'building community' through her work with her children's schools and through the writing of this book.

She sees empowered communities as powerful tools for both the individuals that belong to them and the causes which they espouse.