

GUIDE TO SWAIN
THE SOILS AND WATER ACTIVITY INVENTORY

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ABSTRACT

Soil degradation and water pollution are of significant concern to the agricultural community. An increasing amount of activity in Canada has been directed in the last 5 years towards these topics as well as towards soil and water improvement, conservation and reclamation. A computerized inventory has been developed by the Resources and Environment Section in order to identify and describe the various activities that are currently underway. This guide outlines the data contained in this inventory, its organization and use.

INTRODUCTION

The agricultural industry recognizes a number of soil and water problems related to current farming practices. An increasing amount of effort has been directed towards these problems in various forms. Specific projects, regional programs and government policies have focused attention on these problems and their solutions. These problems are common to several other disciplines such as those involved in mining, forestry, building construction, highways and energy. They have directed extensive efforts towards similar problems and devising solutions for their specific needs. A compilation of information about efforts would be useful to both government and private sectors. Management and field personnel would benefit from the activity listing. Management would like to know what, how and by whom, work is being done. Field personnel would like to know who is currently working on a specific problem and is available to discuss technical details.

To address this need in Canada, SWAIN has been prepared. Each activity has been entered as a separate entry or record in the data base. Each record contains details about the activity. Explanatory information about each entry is provided for policies, programs or projects that are not necessarily published. The activity also must be currently underway. Once an activity ceases to be current, it is removed from the active file to an archive file. Each record includes a series of key word identifiers. SWAIN however, also records descriptive information about the activity and its progress.

It is hoped that the inclusion of additional information, although brief at times, will be beneficial to those concerned with a soil or water problem. This publication is designed to explain what information has been gathered into the data base inventory and how the inventory can be used to assist in the solution of soil and water problems. As a guide to the inventory, this publication will describe the data base using the headings listed below.

- A Information Collected
 - A.1 ACTIVITY DESCRIPTION - what type of information has been obtained
 - A.2 CONTRIBUTORS - the general perspective of the activity as it relates to other entries in the data base
 - A.3 NUMERICAL DATA - organizations that are contributing to the activity
 - A.4 TEXT - numeric values on funding, manpower and duration of the activity
- B Descriptive Terms Used - narrative information that describes the activity and its progress
- C Record Filing - the terms used to describe the information to clarify any differences between word usage by varied disciplines
- a description of the data base records and how information is filed within each record and in

- C.1 RECORD LAYOUT
 - the data base
 - a sample record to illustrate the types of information contained and how they could be arranged
- C.2 CODING SYSTEM
 - the numerical coding of key words to facilitate the filing and retrieval of the record information
- C.3 DESCRIPTION
 - a narrative summary of the activity expressed under the headings listed in Appendix 1
- C.4 DATA BASE FORMAT
 - the technical arrangement of the data on the D-Base III file
- D Data Base Use
 - how to use the inventory to answer specific requests
- D.1 ITEMIZE REQUEST
 - clarification of details of request
- D.2 SELECT FIELDS
 - selection of fields that contain the desired information
- D.3 SELECT CODING
 - selection of coding within the desired fields to extract the specific information needed
- D.4 SELECT OUTPUT
 - decision of how the output is to appear
- D.5 SUBMIT REQUEST
 - preparation of request in writing and submit to the data base developers

METHODOLOGY

The data for the inventory has been gathered through personal communication and published information in the case of government programs. Updating and verification of the information has been through the Regional Offices of Agriculture Canada or direct contact with the contributor. As SWAIN becomes fully operational a more organized data gathering and upgrading will be presented. The current process is attempting to catch the range of potential contributors and users on which a structure can be designed.

The present 196 entries are believed to represent only a part of the wide range of activities currently underway. This Guide to SWAIN is to provide a first step at developing a suitable example to which others can compare their work and its suitability for inclusion in the data base.

A Information Collected

The inventory is composed of unique entities called activities. Each activity forms a file of information related to a soil and water problem or concern. All activities are separated into three levels represented as projects, programs or policies. The activity record contains information which describes the specific characteristics of the activity. The information falls into four categories: activity description, contributors, numerical data and text.

A.1 ACTIVITY DESCRIPTION

The activity is given a unique identification number. It is also described in general terms to indicate the scope, thrust, locations, the number of contributions and how it relates to other entries.

A.2 CONTRIBUTORS

Each contributing organization is described in view of its type and subject of interest. An address and contact are given for each organization where applicable. In cases where more than 4 organizations are participating, the first three are described in detail, while those remaining are combined in the fourth group "Other".

A.3 NUMERICAL DATA

Funding and manpower values are recorded for the activity in thousands of dollars and person years, respectively. Three categories are used: total expectations over the life of the activity; current year allocation from these totals, and; the amounts used of the totals to the date of the last edit. To complement this, the time frame includes the start, end and edit dates. A flag date is also included if another date is critical to the file updating process. (e.g. a progress report pending prior to end date).

A.4 TEXT

Text information is included under a number of headings (called fields) including Title, Client, Objective, Method, Reason, Progress, Reference and Comment. Each field is used, as necessary, to give a clear understanding of the activity and its intent. This information is used to select key words to describe the approach taken to address a specific problem or to encourage a desired practice. The keyword system will be described in more detail under "RECORD FILING".

B Descriptive Terms Used

Terminology often poses problems since many contributors interpret various concepts in different ways. For this reason, definitions of keywords are given in a glossary of terms (Appendix 1) as they apply to this inventory. If additional terms are used on a record, they will be described in the "Comments" field of that record entry.

C Record Filing

C.1 RECORD LAYOUT

Table 1 gives an overview of the layout of an activity record. This layout facilitates the presentation of the key information regarding the activity. For more details of the data base format see section "C.4". The activity record consists of

TABLE I
ACTIVITY RECORD

RECORD IDENTIFICATION					S	L	#										
I D N U M	L	R	R	P	C	O											
					P	A	F										
					E	T											
						I	O										
						O	R										
M	L	D	D	D		N	G	ACTIVITY	CURRENT	SPENT	ACT	THIS	USED				
								TOTAL	ANNUAL	TO DATE	TOTAL	ANNUAL	DATE	START	END	EDIT	FLAG

			T	D	S									
			Y	E	U									
ORGANIZATION			P	P	B	ACTIVITY	CURRENT	SPENT	ACT	YEAR	TO			
			E	T	J	TOTAL	ANNUAL	TO DATE	TOTAL	ANNUAL	DATE			
LEAD ORGANIZATION														
2nd ORGANIZATION														
3rd ORGANIZATION														
4th or OTHERS														

APPROACH :

PROBLEM :

PRACTICE :

TITLE :

CONTACT : Name
Position
Affiliation
Telephone number

CLIENT :

OBJECTIVE :

METHOD :

REASON :

PROGRESS :

REFERENCE :

ADDRESS : Name
Address

COMMENT :

X number of organizations

X number of organizations

X number of organizations

both a text description and a coded description. The text description contains both narrative and numeric information about the activity. The coded description contains a numeric representation of key words indicating who is involved, where the work is occurring and what is being done. Each field will be described as it appears on Table 1 starting at the top left.

The activity record starts with a RECORD IDENTIFICATION. This consists of two numbers: a four digit identification number and a one digit activity level number. It could be one of three levels: project, program or policy. A numeric coding is used for this such as "1" for project (see Table 2). There is space allotted for the inclusion of the identification number of other activities that are hierarchically related to the activity being described.

The two fields, SCOPE and LOCATION use the coding numbers in Table 2 to describe the geographic extent of the activity and its location. For example a scope of "4" would indicate a provincial activity. A location might be designated as "3512" which would indicate the province as Ontario (35) and the census division as (12). When activity is occurring at more than one location, information is given for the headquarters location of the activity only.

The next field, # OF ORG, refers to the actual number of organizations that are participating in the activity. This provides an indication of how much information is contained in other parts of the record. It also enables separation of the contributions by different organizations.

The fields, FUNDING, MANPOWER, and DATES contain information about the cost and time frame of the complete activity. The values in these fields represent the sum total of all contributing organizations. The values for up to four individual contributing organizations are expressed elsewhere as explained below.

Under the heading of ORGANIZATION, there are spaces for four entries. The first would be the lead organization followed by three more in their order of participation. For each entry the terms "type, department, and subject" are included to facilitate the grouping of similar organizations. The coding for these is outlined in Table 2. As an example, an organization can be coded numerically as "2 4 10"; this would be interpreted as a Provincial government (2), Department of Agriculture (4), involved in extension (10). The funding and manpower contributions are recorded for each entry as they contribute to the total described earlier.

The fields, APPROACH, PROBLEM and PRACTICE are composed entirely of numerical coding from Table 2. An explanation of this coding follows in section "C.2".

The remaining fields on the record entry are all narrative in format, reduced to a convenient size and style to permit comparison between records. These fields follow the intent

TABLE 2
NUMERICAL CODING

RECORD IDENTIFICATION

NUMBER	sequential 4 digit number	
LEVEL	1	Project
	2	Program
	3	Policy
PROJECT PROGRAM POLICY	the record number of a related activity	

SCOPE

1	International
2	Federal
3	National Region
4	Provincial
5	Regional
6	Local

LOCATION

PROVINCE	10	Newfoundland
	11	Prince Edward Island
	12	Nova Scotia
	13	New Brunswick
	24	Quebec
	35	Ontario
	46	Manitoba
	47	Saskatchewan
	48	Alberta
	59	British Columbia
	60	Yukon
	61	Northwest Territories

CENSUS DIVISION	01-10	for Nfld
	01-03	for PEI
	01-18	for NS
	01-15	for NB
	01-98	for QC
	01-60	for Ont
	01-23	for Man
	01-18	for Sask
	01-15	for Alta
	01-57	for BC
	01-	for YT
	01-	for NWT

ORGANIZATION

TYPE	1	Federal Government
	2	Provincial Government
	3	Municipal Government
	4	University
	5	Industry
	6	Association/Authority
	7	Individual

DEPARTMENT	1	Agriculture
	2	Forestry
	3	Environment
	4	Natural Resources
	5	Mining

SUBJECT	01	Administration
	02	Production
	03	Research
	04	Regional Development
	05	Plant
	06	Soil
	07	Water
	08	Environment
	09	Geography
	10	Extension

APPROACH

DIRECTION	100's	Conservation
	200's	Improvement
	300's	Reclamation
	400's	Identification

MEANS

Support	20's	1	subsidy
		2	grants
		3	contracts
Collection	40's	1	survey
		2	monitoring
Study	50's	1	basic research
		2	applied research
		3	technology development
Extension	60's	1	technology transfer
		2	demonstration
		3	conference
		4	workshop/tour
Other	90's	1	legislation

PROBLEM

CONDITION	500's	Limitation
	600's	Degradation
	700's	Unknown

SUBJECT

Chemical	10's	1	acidity
		2	salinity
		3	nutrient
		4	pH
Physical	20's	1	wind erosion
		2	water erosion
		3	compaction
		4	stoniness
		5	disturbance
		6	organic matter

Biological	30's	1	subsidence
		2	plant residues
Climatic	40's	1	frost
		2	soil temperature
		3	soil aeration

Water	50's	1	excess soil water
		2	lack of soil water
		3	ground water
		4	surface water
		5	pollution

Economics	60's	1	cost
		2	land use change

Crop	70's	1	yield loss
		2	soil capability

Other	90's	1	soil properties
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PRACTICE

RECIPIENT

800's	Resource
900's	Production

ACTION

Land	1	land forming
Modification	2	terracing
10's	3	land clearing
	4	texture change
	5	ridging

Cultivation	20's	1	no-till
		2	minimum till
		3	conservation tillage
		4	strip tillage
		5	subsoiling

Management	30's	1	cover crop
		2	manure handling
		3	residue management
		4	intercropping
		5	soil management
		6	rotation
		7	contour cropping

Soil Additives	40's	1	mulching
		2	liming
		3	green manure
		4	sewage sludge
		5	fertilizer

Drainage	50's	1	sub surface drainage
		2	surface drainage
		3	diversion
		4	grassed waterway

Structures	60's	1	dugouts
		2	dams
		3	wells
		4	floods
		5	pumping
		6	ditches

Protection	70's	1	snow trapping
		2	windbreaks
		3	erosion control
		4	forage seeding

Irrigation	80's	1	water application
		2	water management

Other	90's	1	awards
		2	mapping
		3	workshop/tour
		4	conference
		5	education

expressed in Appendix 1, page V. An explanation of this part of the record is described in section "C.3".

C.2 CODING SYSTEM

The numerical coding is provided in Table 2. Within each field there are potentially six entries of twin - 3 digit numbers. The first 3 digits represent the key word combinations desired, while the second 3 digits represent the percentage that they contribute to the activity. Examples are 262/050, 554/080, and 853/020 for the approach, problem and practice respectively. The 262/050 would be interpreted as an activity that has an approach direction of improvement by the means of extension and more specifically demonstration. This approach is 50% of the emphasis of the activity. The activity would therefore have other numerical groupings to explain how the remainder is used. Similarly the second example of 554/080 would be interpreted as a problem that was considered a limitation condition within the subject area of water and more specifically surface water. The activity concentrates 80% of its effort in this problem area. The final example of 853/020 would be interpreted as the practice that was for the resource as the recipient with the action of drainage being most important, and more specifically diversion being the end practice. However, this is only 20% of the practices aimed at by the activity. For each field there could be unlimited combinations of key words to describe the activity. Each contributing organization can have two such keyword groupings attached specifically to its efforts.

A special feature of the coding is that the use of a "0" indicates all key words in that grouping apply. For example, the use of 850 as a practice would include all drainage practices (including 851, 852, 853 and 854). In any field where a number is to be reported and there is no known information, the field will be blank or filled with 9's. As a result, if a "0" occurs in a data field it will be used as a true value.

C.3 DESCRIPTION

The remaining fields, Title, Contact, Client, Objective, Method, Reason, Progress, Reference, Address and Comment are all narrative. The information is reduced to a convenient size and style to permit comparison between records. The contents of these fields follow the definitions given in the glossary of terms (Appendix 1). As much information as possible is included in this section to explain the activity. In some cases it is necessary to abbreviate the submitted information to fit in the space available and for consistency.

C.4 DATA BASE FORMAT

The inventory records are stored on WANG floppy disks for printing out record entries and on an IBM Personal Computer for use with D-Base III software. The format of the information fields is outlined in Table 4.

The D-Base III file is structured around field names, type,

width, and number of decimals. The field name is a unique 9 character identifier for a maximum of 128 fields. "Type" refers to the type of storage, be it numeric, character or memo. Numeric contains only numbers while character contains letters and numbers. The memo field is an extended character field in the form of a word processor that is stored separately within D-Base III text file, and the contents of a memo field can be used in searches and outputs. The field width indicates the number of spaces allocated for that field with the associated decimals as necessary.

To assist in understanding the data base format, an explanation is necessary to join the fields discussed in Appendix 1, Table 1 and Table 2, with the field names used by D-Base III and illustrated in Table 4. Twenty (20) abbreviations are used. These are listed in Table 3. Where abbreviations are used for suffixes or prefixes, there are alternates indicated for 9 of those listed. Several examples follow to illustrate how abbreviations are used. TFUNDS would give the total funds allocated for the activity. ORG2TF would give the total funds that are allocated for the activity by organization 2, or the second most involved organization. ORG3APP1 would indicate the primary or most important approach considered by organization 3. APP1 by itself would be the most important approach for the entire activity with no connection to an organization. PRAC5 would be the fifth most important practice for the activity while CPERCENT5 would be the percent of effort of the activity that is being spent on practice number 5. A final example is ADDRESS2 which would be the address of organization 2. For fields that are not abbreviated the names are self explanatory.

D Data Base Use

D.1 ITEMIZE REQUEST

A review of the tables and figures of this report will give an indication of the information that is currently available within the data base. The first requirement of the user is to determine if the information contained and its format is of value to his or her specific needs. Before proceeding, a clear statement of the request should be prepared. Additional information (e.g. cumulative PY or \$ totals) by subject can be generated from the data base to meet specific needs.

D.2 SELECT FIELDS

Using the detailed request objective, the fields that contain the required information can be selected from the data base. Appendix 1, Table 1 and Table 3 can be used to assist in this selection.

D.3 SELECT CODING

Within the desired fields, selection of coding can be done to isolate the specific information needed to meet the request. The coding system in Table 2 can be used in this stage.

TABLE 3
FIELD NAME ABBREVIATIONS

DESCRIPTION	ABBREVIATION	ALTERNATE WHEN USED AS SUFFIX OR PREFIX
<u>I</u> dentification <u>N</u> umber	IDNUM	ID
<u>N</u> umber as in how many	N	
<u>P</u> roject	PROJ	
<u>P</u> rogram	PROJ	
<u>P</u> olicy	POL	
<u>D</u> epartment	DEPT	
<u>S</u> ubject	SUBJ	
<u>T</u> otal	T	
<u>C</u> urrent <u>Y</u> ear Allocation	CY	
<u>S</u> pent to date	S	
<u>U</u> sed to date	U	
<u>F</u> unds	FUNDS	F
<u>P</u> erson <u>Y</u> ear	PY	
<u>O</u> rganization	ORG	
Lead <u>O</u> rganization	ORG1	<u>1</u>
2nd <u>O</u> rganization	ORG2	<u>2</u>
3rd <u>O</u> rganization	ORG3	<u>3</u>
4th <u>O</u> rganization	ORG4	<u>4</u>
<u>A</u> pproach	APP	A
<u>P</u> roblem	PROB	B
<u>P</u> ractice	PRAC	C
Priority of Approach, Problem and Practice	I TO 5	

Table 4
Data Format

FIELD	FIELD NAME	TYPE	WIDTH	DECIMAL
Record Identification				
Number	IDNUM	numeric	4	
Level	LEVEL	numeric	1	
Project	PROJID	numeric	4	
Program	PROGID	numeric	4	
Policy	POLID	numeric	4	
Scope	SCOPE	numeric	1	
Location	LOCATION	numeric	4	
Number of Organizations	MORG	numeric	2	
Funding('000 dollars)				
Total	TFUNDS	numeric	7	
Current year annual	CYFUNDS	numeric	7	
Spent to date	SFUNDS	numeric	7	
Manpower(Person years)				
Total	TPY	numeric	4	1
Current year annual	CYPY	numeric	4	1
Used to date	UPY	numeric	4	1
Dates(Month and year)				
Start	START	numeric	4	
End	END	numeric	4	
Edit	EDIT	numeric	4	
Flag	FLAG	numeric	4	
Organization descriptions for organizations 1 to 4				
Type	ORGNTYPE*	numeric	1	
Department	ORGNDPT	numeric	1	
Subject	ORGNSUBJ	numeric	2	
Total funding	ORGNTF	numeric	7	
Current year annual	ORGNCYF	numeric	7	
Spent to date	ORGNSF	numeric	7	
Total person years	ORGNTPY	numeric	4	1
Current year annual	ORGNCYPY	numeric	4	1
Used to date	ORGNUPY	numeric	4	1
Approaches	APPM**	numeric	3	
from 1 to 5	m = 1 to 5			
percentage emphasis	APERCENTm	numeric	3	
for approaches 1 to 5	m = 1 to 5			
	A_OTHERS	numeric	60	
organization approach	ORGNAPO***	numeric	6	
for organization 1 to 4	n = 1 to 4			
for approach 1 to 2	o = 1 to 2			
Problems	PROBm	numeric	3	
from 1 to 5	m = 1 to 5			
percentage emphasis	BPERCENTm	numeric	3	
for problems 1 to 5	m = 1 to 5			
	B_OTHERS	numeric	60	
organization problems	ORGNPROBn	numeric	6	
for organization 1 to 4	n = 1 to 4			
for problems 1 to 2	o = 1 to 2			
Practices	PRACn	numeric	3	
from 1 to 5	m = 1 to 5			
percentage emphasis	CPERCENTm	numeric	3	
for practices 1 to 5	m = 1 to 5			
	C_OTHERS	numeric	60	
organization practices	ORGNPRACn	numeric	6	
for organization 1 to 4	n = 1 to 4			
for practices 1 to 2	o = 1 to 2			
Title	TITLE	character	120	
Contact for organizations 1 to 4	CONTACT_n	character	120	
	n = 1 to 4			
Client	CLIENT	character	120	
Objective	OBJECT	Memo	10	
Method	METHOD	Memo	10	
Reason	REASON	Memo	10	
Progress	PROGRESS	Memo	10	
Reference	REFERENCE	Memo	10	
Address of organizations 1 to 4	ADDRESS_n	Memo	10	
	n = 1 to 4			
Comment	COMMENT	Memo	10	

* n = 1 to 4

** m = 1 to 5

*** o = 1 to 2

D.4 SELECT OUTPUT

There are a number of ways that the information can be displayed and manipulated. To meet the specific needs of the request an outline of the expected products should be prepared. The space limitations of the printed page should be kept in mind at this stage. Table 4 would be helpful in determining the appropriate page size to display the output. Appendix 2 gives some examples of output products.

D.5 SUBMIT REQUEST

The final step is to prepare the request in writing and submit to the data base developers. If there are difficulties in any of the above steps, then the authors will be able to assist in preparing a final product that contains the required information in a form that meets the needs of the client.

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APPENDIX I

GLOSSARY OF TERMS

RECORD IDENTIFICATION

- NUMBER - the number assigned to each activity as a unique identifier
- LEVEL - the hierarchy of activity as project, program or policy
- PROJECT - the activity with specific goals and resources that represent the most basic unit of work
- PROGRAM - a group of projects of similar goals and resources
- POLICY - an activity involving a number of programs

SCOPE

- International - Involves participation from outside Canada
- Federal - Involves all of Canada
- National Region - Involves a group of provinces of Canada
- Provincial - Involves one province
- Regional - Involves part of a province
- Local - Involves only a local area

LOCATION

- the location of the activity by province and census division within that province using Census of Canada codes

OF ORG

- the number of organizations participating in the activity

FUNDING

- Includes funds that are directed towards the activity by the participating organizations including grants, capital, operating, contract and administration

- ACTIVITY TOTAL - total funds allocated for entire life of activity
- CURRENT ANNUAL - amount of funds allocated for the current fiscal year
- SPENT TO DATE - accumulated expenditures since start date

MANPOWER

- Includes person years directed towards the activity (PY classification is not considered)

- ACTIVITY TOTAL - total personnel allocated for the entire activity
- CURRENT ANNUAL - number of personnel allocated for the current fiscal year
- USED TO DATE - accumulated person years since start date

DATES

- START - when work started
- END - when work is to be completed
- EDIT - when the record was last edited or corrected
- FLAG - when the record should be reviewed

ORGANIZATION

- the description of each contributor in the order of leadership priority as LEAD, 2nd, 3rd, 4th or OTHER

- TYPE - major administrative entity
- DEPARTMENT - major division within the organization type
- SUBJECT - dominant subject area of the involved department

APPROACH

- the approach taken by the activity described under 2 headings: DIRECTION and MEANS

- DIRECTION - the intent of the activity towards the resource
- Conservation - the process of maintaining the resource
- Improvement - the process of changing the resource to a better condition than presently exists

<u>Reclamation</u>	- the process of returning disturbed or derelict land to a productive use
<u>Identification</u>	- the process of determining the situation or condition of the resource
<u>MEANS</u>	- the means of performing the activity
<u>Support</u>	- type of financial assistance given to the activity
grants	- fixed amount given without strict reporting needs
subsidies	- percentage assistance in joint participation
contracts	- fixed amount given with detailed reporting requirements
<u>Collection</u>	- the process of obtaining information
survey	- collecting new information at one point in time
monitoring	- collecting the same information over time to document any change
<u>Study</u>	- the type of examination given the data collected
basic research	- the theoretical examination of a situation or condition
applied research	- the practical application and examination of theory
technology	- the improvement of equipment or techniques to permit field application of research
development	
<u>Extension</u>	- the methods used for information transfer to end users
technology	- the technical information exchange process
transfer	
demonstration	- field examples of techniques for viewing by potential users
conferences	- large group meetings for the exchange of ideas
workshop/tour	- group meetings including field days, seminars, workshops and tours
<u>Other</u>	
legislation	- regulations to encourage or discourage certain practices
 PROBLEM	 - the problem addressed by the activity described under two headings: CONDITION and SUBJECT
 CONDITION	 - the impact of the problem being considered by the activity
<u>Limitation</u>	- the condition that restricts the use of the resource, commonly a natural phenomenon
<u>Degradation</u>	- the process of deterioration of the resource, commonly the result of man's activities
<u>Unknown</u>	- the specific problem is not known
 SUBJECT	 - the problem being addressed by the activity
<u>Chemical</u>	- the chemical components or condition of the soil resource excluding water
acidity	- the soil pH reaction and buffering capacity
salinity	- the accumulation of salts in the soil profile
nutrients	- the fertilizers, chemical elements and compounds needed for plant growth
pans	- the compacted, impervious layers within a soil resulting from chemical reactions
<u>Physical</u>	- the physical features or condition of the soil
wind erosion	- movement of soil by wind action
water erosion	- movement of soil by water action
compaction	- the increase in soil bulk density as a result of heavy equipment use or inappropriate timing of field traffic
stoniness	- the existence of excess stones
disturbance	- the mixing and disruption of the soil profile resulting from construction or excavation activity
organic matter	- the organic fraction of the soil that includes plant and animal residues at various stages of decomposition

<u>Biological</u>	- the living component of the soil that uses the soil organic matter and chemical nutrients
subsidence	- the downward movement of the ground surface caused by solution and collapse of the underlying material as a result of microbial activity in the organic material
plant residue	- the material remaining on and in the soil following the harvest of a crop
<u>Climate</u>	- the macro-, meso- and micro-environmental conditions that impact on the resources and crops
frost	- the condition that exists when air temperature drops to 0°C or lower, but which may or may not result in freeze damage to crops
soil temperature	- the degree of hotness or coldness of the soil at a given time
soil aeration	- the exchange of gases between the atmosphere and the soil pores
<u>Water</u>	- the fluid resource, H ₂ O
excess soil water	- too much water in the soil profile
lack of soil water	- not enough water in the soil profile
ground water	- the subsurface water in the zone of saturation.
surface water	- the water whose surface is exposed to the atmosphere including runoff
pollution	- the contamination of the water resource
<u>Economics</u>	- the expenses associated with the resource and its use
costs	- the direct expenditure of funds
land use change	- the indirect costs related to the resource potential
<u>Crop</u>	- the product or output which is being produced using available resources
yield	- the amount of crop production per unit area either removed for use elsewhere or remaining as crop residue
soil capability	- the ability of the soil to support a desired crop

PRACTICE

RECIPIENT	- described under two headings: RECIPIENT and ACTION
<u>Resource</u>	- to area to which the practice is directed
<u>Production</u>	- the soil or water available for use
ACTION	- the output from the use of the resource
<u>Land Modification</u>	- the expected result of the activity efforts
land forming	- the surface of the soil is altered from its present state as a major effort and commitment to future use of the resource
terracing	- the shaping of the land surface to permit better movement of water and machinery
land clearing	- the construction of embankments and channels across a slope to control erosion
surface texture	- The removal of trees, shrubs and rocks to change the land use
ridging	- the alteration of the soil surface roughness to change its susceptibility to wind or water erosion
<u>Cultivation</u>	- the creation of parallel raised mounds of soil, creating raised ridges and troughs
no-till	- the manipulation of the soil material to incorporate material or to prepare the surface for the planting of a crop
minimum tillage	- the method of planting crops that involves no seedbed preparation other than opening the soil for the purpose of placing the seed at an intended depth
conservation tillage	- the least soil manipulation necessary for crop production or meeting tillage requirements under the existing soil and climatic conditions
	- the tillage sequence that reduces loss of soil or water relative to conventional tillage

strip tillage	- the tillage operations for seedbed preparation that are limited to a band not to exceed one-third of the distance between rows; the area between is left untilled
subsoiling	- the tillage of subsurface soil without inversion, for the purpose of breaking up dense layers that restrict water movement and root penetration
<u>Management</u>	- the organization, planning and supervision of an activity
cover crop	- the crop grown primarily for the purpose of protecting and improving soil between periods of regular crop production
manure handling	- the beneficial use and means of dealing with animal wastes
residue management	- the beneficial use and means of dealing with the plant material remaining after crop harvest for the improvement or protection of the soil
intercropping	- the planting of one crop between the rows of another on the same land
soil management	- the beneficial use and means of dealing with the soil resource
rotation	- the regular alteration of land use for the purpose of improving the soil, controlling disease or changing the crop produced
contour cropping	- the layout of crops in comparatively narrow strips in which the farming operations are performed approximately on the contour
<u>Soil Additives</u>	- the material added to the soil to increase crop yield, or improve the soil
mulching	- the addition of natural or artificial layers of materials that aid in soil stabilization or moisture conservation
liming	- the addition of calcium carbonate to alter the soil reaction (pH) and improve crop yield
green manure	- the living vegetation that is used as an incorporated mulch
sewage sludge	- the municipal waste material that has received some primary treatment
fertilizer	- the materials that are used for the purpose of providing nutrients for crop production, commonly including nitrogen, phosphorus and potassium
<u>Drainage</u>	- the removal of excess surface water or groundwater from land by surface or subsurface drains
subsurface drainage	- the use of tile drains to remove subsurface water from the land
surface drainage	- the use of structures on the surface of the land to remove water
diversion	- the channel, embankment, or other man-made structures constructed to redirect water from one area to another
grassed waterway	- the natural or constructed diversion covered with erosion-resistant grass cover used to conduct surface water from or through cropland
<u>Structures</u>	- the structures that have been designed and constructed to do a specific function
dugouts	- the excavation made for the purpose of storing surface water for later use
dams	- the barrier to confine or raise water for storage or diversion, to create a hydraulic head, to prevent erosion or for the retention of soil, rock or other debris
wells	- the means of obtaining water from the subsurface groundwater
fills	- the unconsolidated material commonly used to improve drainage of engineered structures
pumping	- the movement of water from one level to another using a mechanical device
ditches	- the open excavations commonly used for the movement of water from land

<u>Protection</u>	- the techniques that prevent the resource from being damaged
snow trapping	- the catching of snow and holding it in place to encourage infiltration of the water when it melts
windbreaks	- the growing of plant material or the construction of barriers that will reduce the velocity of the wind on its' lee side
erosion control	- the combination of structures and practices that help reduce water erosion impact on the soil
forage seeding	- the establishment of forages to prevent wind or water erosion and other potential damage to the resource
<u>Irrigation</u>	- the application of water to lands for agricultural purposes
water application	- the means selected for applying water to an area
water management	- the application of practices to obtain added benefits from precipitation, irrigation, drainage and water storage
<u>Other</u>	
awards	
mapping	
workshop/tour	
conference	
education	
 TITLE	 - the name by which the activity is known
 CONTACT	 - the name, position title, organization affiliation and telephone number of the person from whom information about the activity can be obtained
 CLIENT	 - the individual, group or organization for whom the work is being done or the potential beneficiary of the results
 OBJECTIVE	 - an outline, including milestones, of what work is to be done to address a problem
 METHOD	 - the procedure or technique that will be used to meet the objectives
 REASON	 - the justification for why the activity is being undertaken
 PROGRESS	 - a statement of the condition of the work at the edit date in relation to the objectives and milestones
 REFERENCE	 - the full reference of any document resulting from an activity
 ADDRESS	 - the full name and address of all contributing organizations
 COMMENTS	 - additional information that is not applicable to any other category

APPENDIX 2
EXAMPLES OF OUTPUT

RECORD IDENTIFICATION					S	L	#										
					C	O											
					O	C	O										
I	L	R	R	P	P	A	F										
D	E	O	O	O	E	T											
N	V	J	G	L		I	O										
U	E	I	I	I		O	R										
M	L	D	D	D		N	G	ACTIVITY	CURRENT	SPENT	ACT	YEAR	TO	START	END	EDIT	FLAG
								TOTAL	ANNUAL	TO DATE	TOTAL	ANNUAL	DATE				
476	I	476	230	342	4	3539	3	300	100	150	10.0	3.5	5.5	8504	8703	8605	8612

			T	D	S													
			Y	E	U													
ORGANIZATION			P	P	B													
			E	T	J													
LEAD ORGANIZATION			2	1	10				200	0	100	2.0	0.0	2.0				
2nd ORGANIZATION			4	1	6				100	0	50	1.0	0.0	0.0				
3rd ORGANIZATION			5	5	6				0	0	0	7.0	3.5	1.5				
4th or OTHERS									9999999	9999999	9999999	99.9	99.9	99.9				

APPROACH :262/080 360/020

PROBLEM :520/100

PRACTICE :840/050 870/025 853/025

TITLE :Reclamation of agricultural land

CONTACT	:	Name	Mr. P. Jones	Dr. N. Moore	Mrs. J. Bradford
		Position	Director	Head, Soils Section	Field Supervisor
		Affiliation	Agriculture Canada	University of Guelph	A. Industries Ltd.
		Telephone number	613-990-xxxx	519-223-xxxx	446-664-xxxx

CLIENT :Pit and quarry operations, cash crop farmers and agriculture extension staff.

OBJECTIVE :To improve the ability of the agriculture sector to use the information that is available from the mining industry in the correction of their soil limitations and degradation problems.

METHOD :To set up a series of demonstrations, workshops and seminars to show how it can be implemented.

REASON :Soil erosion has been a problem to mining as well as agriculture and it is necessary to share the experiences of both disciplines.

PROGRESS :Five demonstration sites have been established. Three workshops were held and a progress report was published.

REFERENCE :Bradford, J. 1986. Progress in Reclamation. Environmental Journal No.35 Vol.45

ADDRESS	:	Name	Agr. Canada	Soils Section	A. Industries Inc.
		Address	Regional Dev. Br.	University of Guelph	Minesite, Ontario
			S J C B	Guelph, Ontario	K4X 2E3
			Ottawa, Ontario	R2P 4X5	
			K1A 0C5		

COMMENT :The workshops have been well received and it is being recommended that the project be continued beyond its end date. A proposal will be released Dec. 1986

ELEVENTH ANNUAL MEETING

LAND REHABILITATION: Policy, Planning Systems and Operational Programs

June 3 - 6, 1986

University of British Columbia
Vancouver, B.C.



CANADIAN LAND RECLAMATION ASSOCIATION

ASSOCIATION CANADIENNE DE RÉHABILITATION DES SITES DÉGRADÉS

BOX 682 - GUELPH, ONTARIO, CANADA - N1H 6L3

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FOREWORD

The British Columbia Chapter of the Canadian Land Reclamation Association was formed in 1985 to provide a local public forum for the exchange of information and experience in land rehabilitation. Comprised of professionals from a wide range of backgrounds and interests, this organization pulled together quickly to host the 1986 Annual Meeting. The diverse membership in the B.C. Chapter was realized in a program that expanded the scope of the conference to include many fields that have not been represented in past programs. The quality of presentations and range of topics kept audience participation at a spirited level. It is our hope that we have initiated a trend to widen the scope of the annual meetings so as to not focus on traditional mining or energy development issues.

I wish to thank all speakers and attendees for making this first formal function of the B.C. Chapter a success. The enthusiastic support of chapter members in the planning and administration of the conference demonstrated a strong desire for a quality meeting. This drive bodes well for the future of our chapter.

A great deal of effort went into the publication of the proceedings of the 1986 Annual Meeting. Care was taken to accurately reproduce all papers, however minor errors may have escaped the review process. We hope that this will not detract from the information presented by the authors.

May the CLRA and all local chapters continue to grow and function as a focal point for land rehabilitation.