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**Assessment of the WOCAT Methodology in Indonesia**

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**Assessment of the WOCAT Methodology in Indonesia**

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## **Abstract**

Nowadays, soil and water conservation (SWC) has become a global concern. Many countries around the world suffer severe erosion, such as Indonesia, which can threaten food self-sufficiency, as well as degrading biodiversity for future generations. Nevertheless, some factors are increasing the rate of land degradation such as growing population, high rain intensity, deforestation, inappropriate farming practices, overgrazing, and the readiness of past governments to exploit the most fertile land to obtain short-term economic success.

However, since 1972, one incentive of the Indonesian government has evolved which is to adopt a notion of watershed management, and after the Rio de Janeiro Summit in 1992, the government is more strongly involved in conservation programmes.

In 1996, a new methodology was adopted by world-wide institutions - WOCAT (World Overview of Conservation Approaches and Technologies) - which aims to provide tools, collect experience, assess and critically evaluate SWC world-wide in order to help specialists in their decision-making and innovations to reach sustainable land and water management.

Consistent with its commitment, Indonesia, specifically the “Directorate of Watershed Management and Land Rehabilitation” of the Ministry of Forestry, decided in 2001 to join WOCAT and to implement it.

However, after 4 years of identification of SWC technologies and propagation of WOCAT in 31 provinces, this methodology is underused. Only 8 provinces are involved in this process due to lack of funds, but most of them are still at the first step of identification. By assessing the work of three representative provinces, this thesis carries out an evaluation of the actual implementation of WOCAT in Indonesia, and explains why the WOCAT system fails to reach its intended potential at the regional, international and even national level. Constraints to the use of WOCAT include lack of specific funds, time, staff, access to the Internet, organization and cooperation between each level of decision-making. The thesis underlines the need to continue the promotion of WOCAT widely to improve SWC management in Indonesia. However, to reach these objectives, more stakeholders must be involved in this programme and they have to understand the need to share and use international knowledge.

*“The majority of people in developing countries are directly dependent on land resources. Maintaining or improving the quality of these resources is an important step towards improvement of rural livelihood and poverty alleviation, and finally, towards more sustainable development”*

(WOCAT 2005a).

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**Figure 0-1. WOCAT help!**  
(FAO 2001)

# Contents

<b>List of Charts and Figures</b>	<b>vii</b>
<b>List of Symbols</b>	<b>viii</b>
<b>1 Introduction</b>	<b>1</b>
<b>2 WOCAT: an opportunity for sustainable SWC management?</b>	<b>5</b>
2.1 The origin of WOCAT: an emergent preoccupation about SWC.....	5
2.2 An ambitious mission?: "Efficient management of existing knowledge, shared and used globally" .....	6
2.3 The WOCAT process .....	6
2.3.1 <i>Outputs to document and evaluate SWC activities</i> .....	8
2.3.2 <i>Database system</i> .....	8
2.3.3 <i>Outputs to document and evaluate SWC activities</i> .....	8
2.4 The different stakeholders and what WOCAT can offer them .....	9
2.4.1 <i>National and regional SWC institutions, politicians, decision-makers and planners</i> .....	10
2.4.2 <i>SWC specialists and consultants</i> .....	10
2.4.3 <i>Land users</i> .....	11
2.5 Preliminary statement about the main issue of applying WOCAT.....	11
2.5.1 <i>A split between developing and developed countries</i> .....	11
2.5.2 <i>Questionnaires: a lack of time and understanding</i> .....	11
2.5.3 <i>Follow-up difficult to organise</i> .....	12
2.5.4 <i>The Internet: not always accessible and available</i> .....	12
2.5.5 <i>WOCAT: a tool which can be difficult to expand</i> .....	12

<b>3 How WOCAT is currently involved in the Indonesian SWC context</b>	<b>13</b>
3.1 Presentation of the data collection.....	13
3.1.1 <i>The process</i> .....	13
3.1.2 <i>Location of the study areas</i> .....	14
3.1.3 <i>Investigations from the provincial to the field level</i> .....	15
3.2 Main observations of the Indonesian work on WOCAT .....	15
3.2.1 <i>Strengths in carrying out WOCAT</i> .....	16
3.2.2 <i>Weaknesses in carrying out WOCAT</i> .....	18
<b>4 Is WOCAT a solution to improve current SWC management?</b>	<b>23</b>
4.1 Weaknesses of WOCAT limiting its good implementation in Indonesia .....	23
4.1.1 <i>One methodology – Two worlds</i> .....	23
4.1.2 <i>WOCAT confronted with cultural and educational issues</i> .....	24
4.1.3 <i>WOCAT confronted with financial and facilities issues</i> .....	25
4.1.4 <i>WOCAT confronted with institutional issues</i> .....	26
4.1.5 <i>WOCAT confronted with political issue</i> .....	26
4.2 What can WOCAT can bring to Indonesia? .....	26
4.2.1 <i>A strong networking of SWC specialists at national, regional and global levels</i> .....	27
4.2.2 <i>An emergent cooperation which could be strengthened</i> .....	27
4.2.3 <i>To be more involved in the relation with Indonesia</i> .....	27
4.2.4 <i>WOCAT: a good monitoring and evaluation tool</i> .....	27
4.2.5 <i>A new concept: the SWOT analysis</i> .....	28
4.3 Is it desirable to continue to extend WOCAT in Indonesia? .....	28
4.3.1 <i>Some recommendations to overcome the weaknesses</i> .....	29
<b>Conclusion</b>	<b>31</b>
<b>Appendices</b>	<b>32</b>
<b>References</b>	<b>42</b>

## List of Charts and Figures

### Charts

**Chart 2-1.** *Presentation of WOCAT Process* .....7

**Chart 2-2.** *Example of West Java organization from the national to the field level* .....9

### Figures

**Figure 0-1.** *WOCAT help !* .....iv

**Figure 2-1.** *WOCAT emblem!* .....6

**Figure 2-2.** *Logo of the Ministry of Forestry, Republic of Indonesia*.....10

### Map

**Map 3-1.** *Location of the provinces involved in WOCAT in 2005*.....14

### Photo

**Photo 1-1.** *Morpho-erosion in West Java* .....1



## List of Symbols

<b>ASOCON</b>	Asia Soil Conservation Network for the Humid Tropics
<b>CDE</b>	Centre for Development and Environment
<b>FAO</b>	Food and Agricultural Organization of the United Nations
<b>GIS</b>	Geographical Information System
<b>GPS</b>	Global Positioning System
<b>ISRIC</b>	International Soil and Reference Information Centre
<b>NGO</b>	Non Governmental Organization
<b>%</b>	percent
<b><i>Subak</i></b>	Irrigated terraces in Bali
<b>&gt;</b>	superior
<b>SWC</b>	Soil and Water Conservation
<b>SWOT</b>	Strengths, Weaknesses, Opportunities and Threats
<b>WOCAT</b>	World Overview of Conservation Approaches and Technologies

# 1 Introduction

Today, soil and water conservation<sup>1</sup> (SWC) has become a global concern. The UN secretary general, Kofi Annan, has stated that 1/3 of the world's land is degraded. *"Drought and desertification threaten the livelihood of over 1 billion people in more than 110 countries around the world"* (UNCDD 2005).

At the international level, 92% of soil degradation is caused, directly or indirectly by agriculture: 28% by agricultural practices, 35% by overgrazing and 29% by deforestation to open new agricultural lands (SIMMONS 1996).

An infamous example is Indonesia. More than half of the total land area of this archipelago – made up of 13,677 islands from specks of rock to huge islands, Sumatra, Java, Kalimantan, Sulawesi and Papua (LONELY PLANET 2003) – is unsuitable for agricultural development because of very steep slopes (> 15%). Other lands undergo different factors which result in soil degradation (photo 1-1):

- High rain intensity from 1500 to more than 3000 mm/year within a few months of the year;
- The pressure of growing population on land and deforestation to produce more food;
- Inappropriate farming practices reducing productivity of land such as overgrazing; and,
- Little interest from the government as well as land users in conserving soil and water.



**Photo 1-1.** Morpho-erosion in West Java (TATIN 2005)

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<sup>1</sup> According with WOCAT (LINIGER 1998), Soil and Water Conservation can be defined as “activities at the local level which maintain or enhance the productive capacity of the soil in erosion-prone areas through :

- Prevention or reduction of erosion;
- Conservation of soil moisture, and
- Maintenance or improvement of soil fertility.”

Erosion is most serious in the uplands (rain-fed areas) because it brings a loss of fertile top soil to the lowlands (irrigated areas), which gain fertility but later incur problems of sedimentation. So, the productivity of both uplands and lowlands is threatened. However, approximately 70% of the poorest farmers are dependent on uplands and do not have sufficient access to new technologies, production factors, and undergo problems of water shortage. Moreover, since 1972, the Indonesian government – being more concerned about land degradation - focused its efforts with “*Regreening programmes*<sup>2</sup>” on the lowlands (most fertile) to obtain self-sufficiency in rice by intensification plans, forsaking investment in programs of soil and water conservation for the uplands areas (*ADININGSIH and KARAMA 1992*).

Nonetheless, even if the results and efforts seem limited, soil erosion programmes and research are undertaken, and a notion of “Watershed Management” is adopted through the creation of the “Directorate of Watershed Management and Land Rehabilitation” within the Ministry of Forestry. Then, in 1992, during the “Rio de Janeiro Summit”, Indonesia - keen to be more involved in SWC schemes - adopted the main International Conventions - namely “Convention to Combat Desertification”, “United Nations Framework Convention on Climate Change”, and “Convention on Biological Diversity” - agreed to follow the “statement of principles to guide the management, conservation and sustainable development of all types of forests”, and to reach the objectives of the Agenda 21 in terms of SWC and sustainable development (*KEATING 1993; ANWAR 1999*).

In 1992 as well, WOCAT (World Overview of Conservation Approaches and technologies) was conceived by the World Association of Soil and Water Conservation. It is a world-wide programme organised as a consortium of International Institutions and coordinated by a management board where the main actors are the Food and Agriculture Organization of the United Nations (FAO), the Centre for Development and Environment (CDE), and the International Soil and Reference Information Centre (ISRIC).

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<sup>2</sup> “*Regreening - or reforestation - was governmental programmes which recommended planting leucaena on deforested hillsides as a precursor to terracing. Their effects were variable, but it has been noticed that the rate of deforestation is visibly still exceeding the rate of greening and tree planting alone does not necessarily reduce erosion and may even interfere with soil-water conditions*” (*BROOKFIELD and BYRON 1993*).

In 1996, WOCAT was accepted as a global programme by the International Soil Conservation Organization Conference, whose main objective is to implement SWC technologies. The WOCAT Methodology aims to help with this (*appendix I*) (WOCAT 2005a).

Consistent with its commitment, Indonesia, already part of the Asia Soil Conservation Network for the Humid Tropics (ASOCON), decided to join WOCAT.

This thesis aims to show how WOCAT is employed in evaluating existing and past SWC technologies and approaches in Indonesia. The first part presents the WOCAT methodology, followed by an overview of the present execution of WOCAT in three representative provinces. Finally, an analysis of the WOCAT methodology is given to evaluate whether WOCAT has achieved its goals and objectives with regard to SWC implementation in Indonesia. WOCAT's strengths and weaknesses in the adoption of SWC technologies in Indonesia will be discussed.



## **2 WOCAT: an opportunity for sustainable SWC management?**

This first part presents an overview of WOCAT, its main objectives and process, and its main strengths and weaknesses. The question being asked is “Does WOCAT assist in bringing about better organization and management of SWC in developing countries such as Indonesia?”

### **2.1 The origin of WOCAT: an emergent preoccupation about SWC**

WOCAT was born from the necessity to find solutions to world-wide soil degradation and the need to preserve current arable land for growing population.

WOCAT was created after a global and recurrent statement that noted that little documentation about SWC is available, and the exchange and comparison of SWC information between countries is quite unusual. Hence, WOCAT was devised to be a data gathering tool concerned with SWC technologies and approaches. The aim was to avoid SWC specialists making the same mistakes such as selecting inappropriate SWC technologies, using funds inefficiently or duplicating the same efforts.

For this reason, WOCAT aims to provide a world-wide network and some standardized tools, such as reports, database, maps, CD-ROMs and the Internet, to achieve sustainable land and water management; to be exact, specialists and decision-makers would gain better access to information, and some support to improve the decision-making to optimise the implementation of appropriate SWC (*WOCAT 2005a*).

## 2.2 An ambitious mission?: “Efficient management of existing knowledge, shared and used globally”

The WOCAT mission is threefold:

- **Promoting the exchange** of an international valuable knowledge-base in SWC and implementing a process of participation between stakeholders (network of SWC specialists);
- **Enhancing** their search, and critical analysis of appropriate SWC technologies and approaches;
- **Assisting** stakeholders during decision-making and planning process with standardized tools (*WOCAT 2005b*).

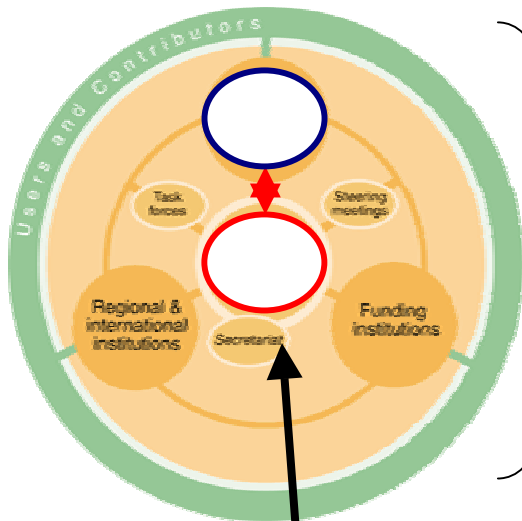


**Figure 2-1. WOCAT emblem!**  
(FAO 2001)

## 2.3 The WOCAT process

The process of WOCAT is to offer different tools to document, monitor and assess SWC technologies and implementation of them.

The following chart 2-1 illustrates schematically the different users and contributors in the process of WOCAT; namely it shows the connection between the management group (decentralised structure), the national institutions and the field level. The outputs and difficulties encountered are presented during an international workshop each year.



**OUTPUTS and RESULTS, from international, national and regional institutions**



### International workshop

Each year an international workshop is organized around the world to make WOCAT known around the globe, to assess with different stakeholders from different countries the weaknesses and strengths of the implementation of WOCAT in order to improve it, and to facilitate and disseminate exchange of experiences.

### Decentralised structure

At the global level, a **management group**, constituted by decentralised international and national institutions such as Food and Agriculture Organization, Centre for Development and Environment and World Soil Information, is in charge of WOCAT.

Their main priorities to optimize the implementation of this programme are **to support national and regional initiatives** such as training programmes in the country by the core management group about data collection, database development, production and development, and to **assist** national and regional institutions in their decision-making (*appendix II*).

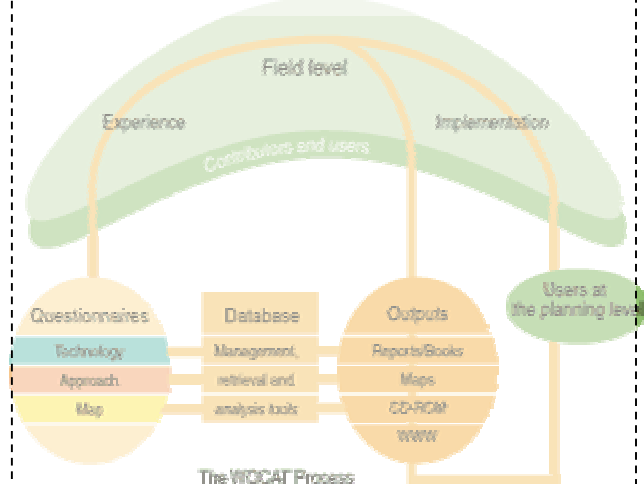


### National Institutions

Carry out regional and national SWC training programmes at regional and field level, to present, implement and diffuse WOCAT through the country.



### Field Level



**Chart 2-1. Presentation of WOCAT Process** (WOCAT 2005c and d, modified)

*To date, Indonesia has completed all the questionnaires, put into the database, but as yet no translation has been done. The process has reached "Outputs and Users at the planning stage". Indonesia did not yet attend an international workshop because the work and the involvement were not significant enough until this year.*



In this following section, the attention will be focused on the questionnaires, database and outputs, which represent the most challenging part of the process to implement.

### 2.3.1 Questionnaires at the field level

Three questionnaires – available in English, French and Spanish - have to be completed as the basis of the collection and documentation of SWC knowledge:

- *Technology*: “**What** are the specifications of the technology and **where** is it used (natural and human environment)?” (*LINIGER 1998a*)
- *Approaches*: “**How** was implementation achieved and **who** achieved it?” (*LINIGER 1998b*)
- *Map*: “**Where** do land degradation problems and their treatments occur?” (*LINIGER and HURNI 1995*)

### 2.3.2 Database system

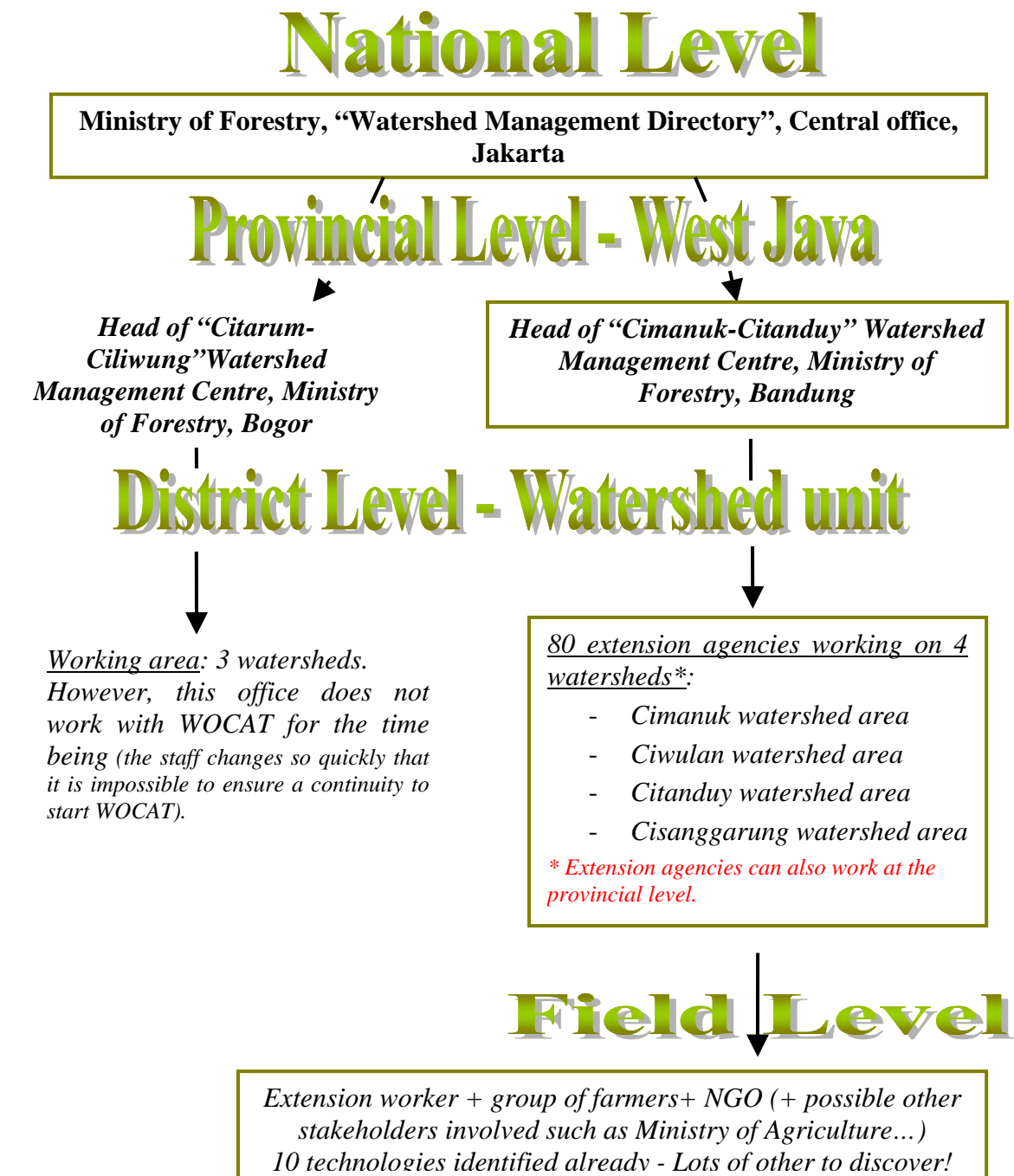
The three questionnaires are completed in the field and the data are then linked to a database available on the Internet and free for everybody.

### 2.3.3 Outputs to document and evaluate SWC activities

- *An interactive database system*;
- *Books, brochures, articles, and regional and national reports*: they are used as guidelines for national and regional initiatives;
- *Maps*: they show the spatial extent of the achievements in term of SWC activities and remaining degradation problems (*Appendix III*);
- *CD-ROMs*: they contain databases, reports on SWC, video, technologies and approaches maps, images and contact addresses; and
- *The Internet*: this network allows the link between SWC specialists and institutions around the world.

## 2.4 The different stakeholders and what WOCAT can offer them

The intended beneficiaries of WOCAT include all stakeholders working towards sustainable land and water management. Before describing their role more precisely, the following chart 2-2 will outline the organization of the Indonesian Ministry of Forestry in each province from the national to the field level.



**Chart 2-2. Example of West Java organization from the national to the field level**  
(TATIN 2005)

*Each province is organized as this one, and WOCAT has to be implemented at each level. This figure is an interesting illustration to demonstrate the difficulty to expand WOCAT in Indonesia.*

### 2.4.1 National and regional SWC institutions, politicians, decision-makers and planners

In Indonesia, the first stakeholder is the “Ministry of Forestry”, *Departemen Kehutanan* (figure 2-1), “Directorate of Watershed Management and Land Rehabilitation”.



**Figure 2-2.**  
**Logo of the Ministry of Forestry,**  
(*Departemen Kehutanan 2005*)

Its main aim is to use WOCAT to provide an overview of the major SWC technologies within the country. Furthermore, the main task is to gather all the information collected in the 31 provinces in order to monitor and assess SWC activities, and to create a valuable database and associated maps.

According to the WOCAT vision, this work should document existing experience, so that any mistakes or duplication are avoided. This information is disseminated through the international network and is presented every year to an international workshop. All of these activities should help the government in its decision-making and its formulation of land use policy.

### 2.4.2 SWC specialists and consultants

In Indonesia, this group includes provincial and district centres of the Ministry of Forestry, and occasionally external consultants and Non Governmental Organizations (NGOs).

They obtain from the Directorate, three questionnaires in order to evaluate and monitor their own province for traditional and new SWC technologies. For this, according to WOCAT, they should have access to international information and experiences from all over the world through books, maps, digital data and the Internet. These should help them understand the biophysical and socio-economic context of SWC, to know strengths and weaknesses of other options, and to have world-wide contacts and information exchange.

### **2.4.3 Land users**

The Ministry of Forestry works at the catchment scale, and land users include everyone within the catchment such as foresters and farmers. The Ministry's actions are really focused on upland areas, which receive less attention from the government and suffer presently serious problems of erosion. The land users should receive information about WOCAT, SWC training programmes, access to a wider choice of SWC measures and support to implement the most sustainable solutions, taking into account the environment as well as their constraints, needs, and priorities.

## **2.5 Preliminary statement about the main issue of applying WOCAT**

The description of WOCAT and its process brings some questions about its feasibility to be implemented in a country. The following section highlights the main issues.

### **2.5.1 A split between developing and developed countries**

The first difficulty concerns the non-availability or the difficult access to certain resources such as financial and logistic ones (Internet, vehicles and travel, funds, and Global Positioning System - GPS<sup>3</sup> -). How can the international knowledge be shared equally, and is it possible to give everybody the same support and guarantee to achieve sustainable SWC?

### **2.5.2 Questionnaires: a lack of time and understanding**

The translation and the number of pages of these questionnaires (approximately 200 pages altogether) are a main issue. It takes time to translate into Indonesian, and often people are not fluent in English and could miss some key notions because of their misunderstanding. Moreover, staff do not always have access to extra funds to go to work in the field to fill the questionnaires. They have to do it at the same time as other purpose, which can decrease the quality of the results.

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<sup>3</sup> GPS is required to obtain and produce georeferenced field data which will be easily integrated in a Geographical Information System. This latter will permit the production of maps as well as area calculations on various aspects of SWC (*LINIGER and HURNI 1995*).

### **2.5.3 Follow-up difficult to organise**

The next issue concerns the linkages between national and regional decision-makers, and the access to the information in the database. Specifically, at the regional level, access to the Internet is not available, and/or the translation into English is not feasible. The database is completed on a computer and then sent to the national level. It is easy to “forget” about WOCAT:

- At the regional level because the head of office changes frequently, the staff cannot see the results of their work on the Internet, they cannot look on the Internet for other world-wide experiences and there is no critical assessment of their work compared with other users of WOCAT.
- At the national level because they are overloaded with other tasks, there is no time to translate WOCAT, and no specific funds to do it.

### **2.5.4 The Internet: not always accessible and available**

How can WOCAT be applicable when there is no access to the Internet? Are there alternative solutions? Are there enough books or CD-ROMs to promote and diffuse the ideology of WOCAT from the regional to the field level?

### **2.5.5 WOCAT: a tool which can be difficult to expand**

This issue concerns the transmission of the tools, such as CD-ROMS and books, in the field. Are they available from the national to the field level, at each step of the organization of a ministry, an agency or an institution? How can WOCAT be easily implemented if there is no access to the outputs, no knowledge or no translation into the national language such as Indonesian?

*WOCAT is arguably very ambitious, and as has been noticed above, it is not so easy to implement. The application of WOCAT in Indonesia for better SWC implementation and management is evaluated here - does WOCAT present new tools and vision to help better SWC management?*

## **3 How WOCAT is currently involved in the Indonesian SWC context**

A critical overview of the past and current SWC situation in Indonesia is presented in order to understand and assess how WOCAT has been integrated at different scales, from the national to the field level. Then, an analysis is made of whether WOCAT could be a useful instrument to help Indonesia improve SWC implementation.

### **3.1 Presentation of the data collection**

#### **3.1.1 The process**

Before departure for Indonesia, some global information about WOCAT, the country, soil degradation and SWC measures was searched. A deeper investigation was then carried out in the library of the Ministry of Forestry, with the ASOCON Programme Officer who coordinates the implementation.

With a better understanding of WOCAT, it was decided to analyse the process to implement it in the field. Different situations were chosen in order to appreciate the ease or difficulty in applying WOCAT – some provinces had highly motivated and committed staff, others were less active.

### 3.1.2 Location of the study areas (map 3-1)

It was feasible to study three representative provinces (*appendix IV*):

1. West Java, Bandung area: this province is the most involved, active and motivated in the diffusion of WOCAT.
2. DI Yogyakarta: this was one of the first provinces to be involved in WOCAT, but currently no work is being done, and the staff do not know anything about the methodology.
3. Bali: - became involved in WOCAT in response to an international request.



**Map 3-1. Location of the provinces involved in WOCAT in 2005**

(ANWAR 2001, modified)

*In red - provinces studied; in blue – others provinces involved.*

*31 provinces compose Indonesia; but at the moment only 8 are involved in WOCAT.*

*This map shows the broad variety of situations in Indonesia: huge area, different climates, cultures, and technologies. It is already difficult to share knowledge and implement different technologies between provinces in the same country, so the work is vast at an international level.*

### **3.1.3 Investigations from the provincial to the field level**

The aim was to identify in each level of decision-making (*chart 2-2, page 8*) what the WOCAT perception was. Generally, land users did not know about the programme. Further investigation has been carried out to understand why.

Concerning the administration who know about WOCAT, the next step was to ask them some questions and to visit fields with them to appreciate their understanding and application of WOCAT, especially the pros & cons of this process.

When the staff did not know about WOCAT – the most common case in the provinces - it was interesting to assess their knowledge and work with SWC, and their organization. The approach taken was to understand and evaluate the strong and weak points of such organizations - as a pre-diagnostic of the situation. The result may affect the success of the implementation of WOCAT.

Then, between each province, the main difficulties to extend WOCAT, their comments about it, their weaknesses and strengths to do it have been compiled, and then analysed in comparison with the expectation of the national coordinator, and the general ideas of WOCAT itself.

## **3.2 Main observations of the Indonesian work on WOCAT**

A current assessment of the main strengths and weaknesses of the Ministry of Forestry - concerning its organization from the national to the field level, and its way to implement WOCAT – will be presented in order to comment on the feasibility to continue the expansion of WOCAT in Indonesia, to improve the strong points and to overcome the weak ones.

However, differences could be perceived from this general statement among provinces depending on their own work and organization.



### **3.2.1 Strengths in carrying out WOCAT**

#### **3.2.1.1 Really motivated staff**

The staff involved at each level - from the national coordinator to the extension worker - are really motivated to use WOCAT and understood the need to exchange data between provinces, to share international knowledge and to have access to these data: *“WOCAT belongs to the public domain and everybody can and should have access to it. WOCAT allows gathering more systematically information and it is an interesting tool to support decision-making”* (ANWAR 2005). Moreover, they are really interested to have technical comments about their work and new ideas. They know WOCAT will allow gathering SWC technologies within the countries into a unique database, and will bring an answer to their need of new experiences and ideas.

#### **3.2.1.2 National motivation to expand WOCAT**

In 2001, 8 representative provinces were chosen to implement WOCAT. Since 2002, the work of the national coordinator was to extend WOCAT through the other provinces using the results concerning the identification of SWC technologies of the first provinces. However, realizing that the progress of the extension of WOCAT is slow, the coordinator will provide friendlier guidance on WOCAT implementation at each watershed centre office.

Moreover, the translation of the questionnaires into Indonesian was accomplished and, some guidance about them was also presented to help the staff to implement WOCAT in their province. The main idea of the coordinator is to leave the staff free to use WOCAT and to do what they think is the best to help land users to manage in the most sustainable way SWC, because *“they know the field!”* (ANWAR 2005).

#### **3.2.1.3 An emergent cooperation**

While it is involved in WOCAT, Indonesia is also a host of the ASOCON coordination unit, and today, it is its regional coordinator. ASOCON is a network among Asian

countries to share information in developing and improving programmes in SWC. It is a good basis to work side by side with WOCAT.

The positive thought of the Ministry of Forestry is to consider the work at the catchment scale and not individual land users. Moreover, in some provinces such as in Central Java, a notion of integrated approach is present; namely the staff used to cooperate with different stakeholders to complete their project.

At the provincial level, close work and exchange of data between different scales happen often. Meetings between head of provinces happen regularly and are realised to be crucial in order to know more about the work of each other. Some SWC training programmes can be planned between provinces for land users or staff to have new ideas or to share their work. In West Java for instance, the staff have involved a local NGO to help them to complete the questionnaires and extend WOCAT within the province.

At the field level, there is an adequate and very good support, follow-up and training from the extension workers to the land users. There is a strong organization and participatory approach; namely, extension workers, land users and different stakeholders such as NGOs and different ministries are working together to enhance and develop the initiatives - often voluntary – of the groups of motivated land users.

The extension workers promote also the interaction between land users helping them to disseminate their experiences through other groups in the same area and putting them into contact. The land users are not reluctant to share information. There is almost a better organization at the field level – as it would be good to implement for WOCAT - than at the district, provincial and even national scale.

The questionnaires are always completed in association with the staff of the provincial level, the extension worker and the different land users. Moreover, some staff can have different backgrounds, such as agriculture or fishery. It is a real positive point to complete in the most accurate way the questionnaires.

#### **3.2.1.4 A country rich in SWC technologies (*Appendix V*)**

Indonesia is rich in SWC technologies and approaches such as mangrove rehabilitation, social forestry, alley cropping, gully dam, and stone terraces. It could be the origin of an

“INDOCAT” database as a new source of information to share with the rest of the world into the database.

### **3.2.2 Weaknesses in carrying out WOCAT**

#### **3.2.2.1 A difficult task to promote WOCAT**

The adoption of WOCAT in Indonesia is still weak; only a few specialists are familiar with this methodology. According to the national coordinator, the extension of WOCAT everywhere in Indonesia, at each scale, should be the most difficult part.

The complexity will come from the hugeness of this country, the wide variety of cultures, languages, social acceptance, and climates, and especially the access to the Internet, not only for the farmers, but also for the staff. The first step should be to inform EVERYBODY a propos this programme. However, the national coordinator is mostly alone to diffuse WOCAT through all this vast territory. It is a huge task when there are no proper funds attributed for this. Moreover, more people must be involved at an upper level in the Ministry of Forestry to coordinate WOCAT and not only a staff of the Ministry.

In 4 years, only 8 provinces were involved in WOCAT. However, some of them have not yet completed the first step of identification, others need to be re-motivated to continue their efforts, and some stopped working with this programme. They do not perceive the interest to work with this new methodology - similar for them as a development project - and they do not have time to spend on this. However, WOCAT is not a project, it is a system. It is essential to motivate them showing the interest they can gain to exchange data at the national and international level.

It is difficult as well to have a proper supervision when staff members, and especially the person in charge, change frequently. Hence, there is not always a constant linkage to continue the work on WOCAT.

Regarding the extension of WOCAT, the coordinator provides books and materials but asks the staff to take their own initiatives to implement WOCAT. However, the staff admit they do not really know what they have to do after the identification. Some put

their data into the database but they did not yet translate them. It takes time to translate and often the work about WOCAT stops at this step.

The work is still not used at the international level. The staff feel isolated to do this, and without national support. Some staff do not know who is in charge of the programme: Ministry of Forestry or Agriculture? They do not want to take new decisions alone, without referring to the national level. The project can stagnate. The staff ask for guidance and follow-up. Nevertheless, it is almost impossible for one person to oversee all the provinces. Moreover, at present, the staff consider WOCAT more as a database to survey all the Indonesian technologies than an International database to exchange knowledge and ideas.

### **3.2.2.2 An independent way of work**

According to the WOCAT management group, Indonesia has been working in its own way since the beginning – which is excellent on the one hand, but on the other hand avoids WOCAT ensuring an appropriate feedback and reacting properly to problems encountered or questions raised.

At the national level, except with some centres of research and the extension office of the Ministry of Agriculture, there is no real cooperation with other stakeholders in the daily work. Moreover, even the staff inside the Ministry of Forestry are not aware of WOCAT apart the Watershed office staff (approximately 10 persons).

There is a lack of coherence between decision-making in departments and implementation agencies in general and little cooperation with other stakeholders in the daily work. At the provincial and district level, the staff are not always aware about the work of the other provinces, who is working with WOCAT, and are used to being more independent rather than working together.

The lack of coordination, associated with the need of supervision, are limiting factors to the implementation of WOCAT within the country.

### **3.2.2.3 WOCAT questionnaires: some tools difficult to employ**

Concerning the questionnaires, the first complexity was to translate them into Indonesian; it takes time and few persons are really fluent in English.

The questionnaires are also too long to complete and time consuming. Furthermore, the staff choose just the most representative place for the technology, and complete only one questionnaire for it.

Some provinces do not possess GPS which can pose a problem to collect field data which is easy to use by WOCAT for a global GIS.

Moreover, all the parts of the questionnaires are not always completed such as the information on costs, inputs, benefits - not always available by land users - and the questions about weaknesses and disadvantages of the technology. Especially the staff never answer the question: "*How to sustain/improve the strengths or to overcome the weaknesses?*" The reasons are mainly due to the forestry background, and also the fact they do not always understand the question in English. Consequently, they give just a description of the technology and approach without doing an analysis of them. However, it is really essential to evaluate a technology. The interest to use WOCAT and to exchange information is to have new ideas to improve SWC technologies. If the staff do not assess their own work and do not understand the need to do it, WOCAT will serve just as a documentary tool.

The staff can also miss assessing some agronomic soil degradation problems such as salinization of irrigated fields because they are not aware of these problems. They must work with other stakeholders to compensate their lack of knowledge, but in some provinces it is not always a habit to do this.

### **3.2.2.4 Lack of facilities: a real problem to extend WOCAT**

There are no funds allocated for WOCAT to realize national training programmes in order to promote the methodology, to attend the yearly WOCAT international workshop, or to visit and supervise the different provinces.

The Internet is available just at the national and provincial level, but it is very limited: few computers are connected and the connection is very slow. The staff cannot send directly their results nor do they have easy access to international information which can result in loss of motivation about WOCAT.

There is not enough free time, staff or extra funds, for instance to buy fuel to go in the fields for WOCAT. Moreover, the staff also need to ask each time for an authorization to the head of office to set about any kind of work or to go somewhere in the province. They are prisoners of a bureaucratic system because they always have to consult the upper level to do something, and this is time-consuming with very few real actions.

### **3.2.2.5 Land users not included in WOCAT process**

When WOCAT is implemented, the vision concerning this programme becomes narrower at each level. At the national level, the interest of WOCAT is to exchange international data. At the provincial level, the interest is to know what happens in Indonesia and try to exchange data between provinces and, at the field level, WOCAT looks interesting to identify new technologies and diffuse them around the locality. Nonetheless, there is no propagation of the notion of WOCAT among land users because the staff never mentioned it in their presence. However, some land users could have the opportunity to use the Internet and look independently for information to improve their voluntary SWC initiatives. Even without access, they must know about WOCAT, where they can find new ideas, and to orient people who have the Internet to look for them. Why not help the main beneficiaries of WOCAT by giving them access to a new and powerful source of information?

*Will it be possible to continue to extend WOCAT in Indonesia - does this methodology really bring a new approach to implement better SWC practices and support the decision-making? Should Indonesia continue to implement it? These questions will be answered in the following chapter.*



## **4 Is WOCAT a solution to improve current SWC management?**

The adoption of WOCAT in Indonesia is still inefficient. Hence, to know if WOCAT is a solution for better SWC practices, it is essential to consider first these questions: *“Is it Indonesia who failed in the application of WOCAT due to its lack of organization and funds?”* or *“Is it WOCAT which failed due to its too ambitious programme and the difficulties to implement it in a developing country?”*, or *“Is it due to the weaknesses of both?”*.

The previous chapter showed the strengths and weaknesses of the work done by the Indonesian government in the implementation of WOCAT. This chapter analyses the WOCAT methodology in the Indonesian context. It is necessary to have an overview of both sides before discussing the viability and interest of continuing the execution of WOCAT in Indonesia.

### **4.1 Weaknesses of WOCAT limiting its good implementation in Indonesia**

The following section highlights the limitations of WOCAT faced with a real situation, Indonesia. The sections below allow the consideration of different options to overcome the problems of the implementation of WOCAT in Indonesia and to achieve better SWC practices.

#### **4.1.1 One methodology – Two worlds**

One of the WOCAT aims is to promote the exchange of international knowledge by a global network. This notion is really difficult to apply when the objectives, the acceptance by the local population, the culture, and the climate are totally different from one place to another.



Concerning Indonesia, it is really complicated to cover different regional contexts with a standardized approach. Moreover, WOCAT methodology does not differentiate developing and developed countries; which is good in one way but on the other side imposes more constraints on developing countries. WOCAT is feasible, when there is a structure, a good organization in the country, and facilities such as funds and access to the Internet. However, this is rarely the case in developing countries.

#### **4.1.2 WOCAT confronted with cultural and educational issues**

##### **4.1.2.1 A universal language not accessible to everybody**

A global network is not easy to implement when not everybody speaks the same language. The majority of the countries which suffer from land degradation are not English speakers, and still there are many difficulties from the management group to translate WOCAT into local languages.

In Indonesia, apart from some executive staff, few persons speak English. Especially, the staff who implement WOCAT in the field do not speak this language or just a few words to communicate. This problem brings out misunderstandings in translating and completing questionnaires and databases. The work often stops at the point when the data needs to be submitted to the international network, waiting for someone who can translate them. Moreover, the staff and land users - who do not speak English - cannot look for information independently on the WOCAT website (main support and interest of WOCAT) or even in the outputs without help of someone who can understand this language. Hence, land users are totally excluded from the system as they cannot look by themselves for the information needed.

##### **4.1.2.2 A descriptive rather than analytical work**

The main interests of WOCAT are to assess, make a critical study of the current work carried out in SWC and use ideas from other countries. However, in Indonesia, the first questionnaires completed showed different results. The staff never assess their own work. They are just describing technologies and approaches rather than analysing them. For them, WOCAT is the possibility to create their database and they did not really consider the interest to use foreign ideas to improve their work.

### **4.1.3 WOCAT confronted with financial and facilities issues**

#### **4.1.3.1 A budget limiting the actions of WOCAT**

WOCAT has a policy that participation should be on a cost sharing basis as there are not enough funds to sponsor all participants. Countries with an ongoing WOCAT activity -which was not the case of Indonesia so far - get priority in sponsoring.

Most countries involved have managed to allocate some funds for the WOCAT data collection and evaluation. However, it was not the case for Indonesia. Consequently, Indonesia encountered difficulties in being more involved in the programme and did not receive a proper follow-up from WOCAT.

Moreover, this lack of investment prevents Indonesia in participating in the international workshop. They attended the very first meetings in Riederalp (1993) and Wageningen (1994) but did not continue to attend, mostly for financial reasons. This means Indonesia is not active in WOCAT which has several consequences. For instance, in 2003 in Kathmandu, Nepal, different Asiatic countries underlined some problems to implement WOCAT and try to find solutions. At present, Indonesia is facing the same problems as reported by all of these countries two years ago. If Indonesia had attended this meeting, it would not make the same mistakes today and the implementation of WOCAT would be better and faster.

#### **4.1.3.2 A transmission difficult to organise when the Internet is not available**

To promote the exchange of international information, WOCAT is mainly based on the Internet. In Indonesia, at the national, and sometimes at the provincial level, the access to this tool is slow and restricted to one or two computers.

Under these levels, there is no Internet in the offices. It is not easy to provide at each level the outputs such as books or CD-ROMs – considering also the language issue -; hence, the exchange of knowledge is really difficult to propagate.

#### **4.1.4 WOCAT confronted with institutional issues**

WOCAT has to deal with organizational issues as described for Indonesia in the sections 3.2.2.1 and 3.2.2.2. The lack of cooperation emphasizes the difficulty to expand WOCAT within the country and to assure a proper follow-up by the Core Management group. It would be interesting that WOCAT helps these countries to implement a better SWC network with main guidelines, or to apply for international subsidies in order to build a national network able to support this methodology afterwards.

#### **4.1.5 WOCAT confronted with political issue**

Land degradation is not the main concern of the Indonesian Government which is still more interested to obtain short-term economic success. At present, few “key” decision-makers are involved in WOCAT limiting its expansion and the potential interest to use WOCAT as a basis to modify land use policy.

*In summary, the adoption of WOCAT in Indonesia is slow; and presently, WOCAT still does not achieve its goals and objectives with regard to SWC implementation in this country. However, after the overview and analysis from both sides – WOCAT and Indonesia - the discussion will underline a critical question: “Can adoption of WOCAT really help Indonesia achieve an efficient and sustainable SWC management?”.*

### **4.2 What can WOCAT bring to Indonesia?**

In order to know if adopting WOCAT can really help Indonesia achieve an efficient and sustainable SWC management, its main benefits must be proved. This will also enthuse staff who are not yet involved in this programme or those who are less involved because of lack of constant follow-up. It is essential to demonstrate to them the need to be involved and why it is so essential to share world-wide knowledge.

#### **4.2.1 A strong networking of SWC specialists at national, regional and global levels**

There is a need for communication and networking among countries. WOCAT offers Indonesia and other SWC specialists and land users around the world participation and sharing of international knowledge. This allows avoiding the risk to make the same mistake, opening the mind of the people involved, and improving SWC technologies. WOCAT can also result in more expertise at national and regional levels and promote the work of Indonesia in SWC at an international scale by the creation of an “INDOCAT” database.

#### **4.2.2 An emergent cooperation which could be strengthened**

The cooperation between levels of decision-making is already existent but emergent. WOCAT can be a powerful tool to strengthen this structure and continue its development within the country. It allows cooperating with different international agencies / organizations / programmes at various levels. WOCAT brings new thoughts: working together (between provinces until the international level) and having an integrated approach to the land degradation issue. Moreover, when a country begins to work by itself with WOCAT, it shows commitment and this should facilitate attracting donor funds.

#### **4.2.3 To be more involved in the relation with Indonesia**

Assuming Indonesia will begin an active participation in WOCAT this summer, the Core Management group asked the national coordinator whether WOCAT organizers would like to assess the current situation in Indonesia in order to decide on sponsoring its participation in the 2005 International workshop in Serbia-Montenegro. Also, the Management Group proposed providing resource persons for training programmes which should take place in Indonesia at the end of the year.

#### **4.2.4 WOCAT: a good monitoring and evaluation tool**

One of the main interests of WOCAT is to bring critical analysis of the work done in SWC.

WOCAT can provide staff with different tools to document, monitor and evaluate SWC know-how in order to reach efficient and sustainable SWC management. Even if the staff do not seem familiar with all of these tools, it was perceived as a growing concern from them regarding the evaluation of their work.

The WOCAT methodology can allow Indonesia to build a national network – “INDOCAT” – to have a better and standardized knowledge of its territory in order to use it for optimal planning and support in its decision-making of national policies. However, training programmes must underline the need to create Indonesia’s own database as well as the need to be aware of the work done by other countries. This should result in new ideas to implement SWC technologies and new approaches.

#### **4.2.5 A new concept: the SWOT analysis**

WOCAT is now based on the SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) carried out at the Annual Steering Meeting in Yichang, China in 2004. This approach is fundamental for Indonesia which can deal with this new notion to implement SWC tools. This approach can help the staff to understand the need to assess SWC technologies and that data collection is not the main objective. Training must be focused on self-evaluation, monitoring, dissemination and use of WOCAT.

*As mentioned above, WOCAT can also be a synonym of great changes and benefits for Indonesia. The next and last part will discuss this topic: “Does Indonesia have to continue to be involved and extend WOCAT?”.*

### **4.3 Is it desirable to continue to extend WOCAT in Indonesia?**

Indonesia needs a programme to continue and improve its efforts in SWC. WOCAT can be a solution because it can allow this country:

- to collect and gather in a standardised database all the rich knowledge in SWC from each island, resulting in considerable amount of information depending on the context, the climate, the culture and the people;
- to implement a resourceful organization within the Ministry and a strong cooperation with different stakeholders.

#### 4.3.1 Some recommendations to overcome the weaknesses

WOCAT belongs to the public domain. It is the responsibility of everyone to diffuse this methodology throughout Indonesia. People already involved must convince some “key” persons inside the Ministry of Forestry such as head of office, and also other stakeholders, such as the Ministry of Agriculture, of the usefulness of WOCAT. An interesting solution would be to create an interministerial committee at the national level to work together on WOCAT.

This methodology also needs to be promoted through exhibitions, national training and media for instance. More people must be involved and participate strongly to assure the future of WOCAT.

Moreover, people must work together. The staff must stop working on their own, and collaborate with each other. Different backgrounds and stakeholders result in better cooperation, exchange (for instance to complete the questionnaires) and organization. Indonesian people refer often to the Asian philosophy translated as “*To be close and work together*”. Hence, it could be an excellent idea to remind them of this sentence to motivate them in implementing a better exchange and cooperation between all parties.

From the national to the field level, someone needs to be appointed to coordinate WOCAT. This will allow a constant link between each scale and will avoid forgetting the work already done on WOCAT if someone has to move posts.

For once, the staff are free to have their own initiatives to implement WOCAT. “*They know the field*”. They must use this opportunity to adopt, propagate and develop new techniques and approaches and if there are some doubts, staff should not hesitate to ask the national coordinator. If there is no access to the Internet, they must also ask the coordinator for other outputs such as books and CD-ROMs.

Anyway, the staff need friendly guidance from the national coordinator. The guidance should be written in Indonesian and will give advice on the WOCAT process as well as how to complete the questionnaires and to use the database. Stronger emphasis on implementation strategies must also be given through national training programmes, and technical support will need to be strengthened.

It would be practical that WOCAT creates guidance and training concerning analysis. The staff must understand how to assess and criticize SWC technologies in the questionnaires to improve them in the future. The analysis is a fundamental step and the effort of WOCAT and the national government must be concentrated on this.

The land users must be informed about WOCAT. The next step will be to inform them about this methodology during the phase of questionnaires or during SWC training programmes in order to integrate them into the international network. They should be the main beneficiaries of the programme and they should be very well organized. The staff must emphasize and take as a basis their work.

At present, Indonesia is invited to attend an international workshop. This meeting could help the country overcome their difficulties (section 3.2.2) with the international experience, in particular Asiatic countries such as Philippines or Thailand, which are more advanced in the execution of WOCAT.

Moreover, if Indonesia wants now to demonstrate its active participation in WOCAT, it must find funds for it in order to attend international workshops and for data collection and evaluation. On the other side, WOCAT could have two policies, one for developing countries and another one for developed countries. For instance, WOCAT could save a part of its budget by supporting developing countries from the start, offering them an opportunity to attend the international workshop and sending WOCAT organizers during the first year to the country to ensure the correct implementation of WOCAT. These countries do not often have enough funds to implement WOCAT or attend workshops leading to discouragement and abandonment. To support them from the start would increase their involvement and avoid any feelings about lack of support.

WOCAT means open-mind and international exchange. It is vital to understand this notion if Indonesia wants to implement this programme usefully.

## 5 CONCLUSION

Indonesia is still at the beginning of its application of WOCAT, and so far, its actions have not been considered as active participation by the Core Management group. However, for 4 years, the strong involvement of some people inside the Ministry of Forestry to implement WOCAT has been noticed and has resulted today in the opportunity to integrate actively in the international WOCAT network. Attending the international workshop in Serbia-Montenegro this year and having support and training programmes in Indonesia from WOCAT staff are two great successes for Indonesia today. Its WOCAT activities must be pursued and strengthened.

However, some problems have been encountered – the main ones are the lack of funds, cooperation and English speakers. These limitations must be overcome if Indonesia wants to have effective results in SWC.

This thesis raised a main dilemma: *“Is WOCAT the solution to overcome the problem of land degradation?”*

Some weaknesses have been identified in both the institutions within Indonesia and the structure of WOCAT – although today it is impossible to say that implementing WOCAT is a barrier for better SWC management in Indonesia. On the contrary, WOCAT is a powerful tool and has a lot of benefits to bring to Indonesia. However, Indonesia must be fully aware of its institutional limitations and understand how to use WOCAT effectively, especially the analytical parts. It is also essential that Indonesian staff do not only consider WOCAT as a database but use it as a great system to exchange and gain world-wide ideas.

Finally, research which parallels the present study but based in Asiatic countries such as Philippines or Thailand which are more advanced than Indonesia in the work with WOCAT could be interesting to undertake. It could allow Indonesia to understand the main problems with WOCAT and solutions found in similar geographical conditions.

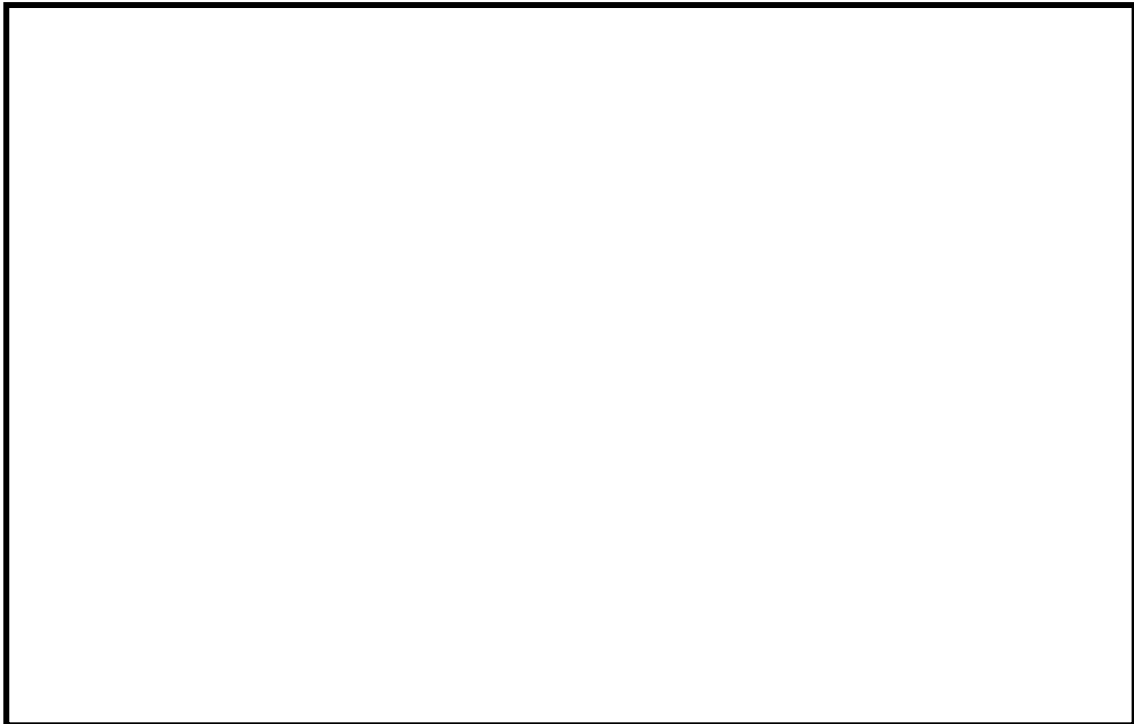


## Table of Appendices

<b>Appendix I – <i>Frame of the International Context of WOCAT</i></b> .....	33
<b>Appendix II – <i>International organization of WOCAT : Decentralised structure</i></b> .....	34
<b>Appendix III – <i>2004 WOCAT World Map</i></b> .....	35
<b>Appendix IV – <i>Description of the three provinces studied (strengths and weaknesses)</i></b>	36
<b>Appendix V – <i>A country rich in SWC technologies – The beginning of INDOCAT</i></b> ... ..	38

## **Appendix I**

### **Frame of the international context of WOCAT**



This figure allows a better understanding of the place of WOCAT from an international level to the WOCAT programme. Moreover, it is possible to notice the Agenda 21 is at the origin of the creation of WOCAT. It is also during this conference that Indonesia decided to be more involved in SWC. Hence, it becomes explicit why Indonesia chose WOCAT to improve its management in SWC (*WOCAT 2005a, modified*).

## Appendix II

### International organization of WOCAT: Decentralised structure

The followings illustration and map present the stakeholders composing the management group of WOCAT and their location around the world.



#### The organizational set-up of WOCAT (WOCAT 2005d)

##### WOCAT Core Management Group:

- **CDE:** Centre for Development and Environment, University of Bern, Switzerland
- **ISRIC:** World Soil Information, Wageningen, The Netherlands
- **FAO:** Food and Agriculture Organization of the United Nations, Rome, Italy

##### WOCAT Enlarged Management Group:

- **BSWM:** Bureau of Soils and Water Management, Department of Agriculture, Quezon City, Philippines
- **ICARDA:** International Centre for Agricultural Research in the Dry Areas, Aleppo, Syria
- **INSAH:** Institut du Sahel, Bamako, Mali
- **RELMA:** Regional Land Management Unit, SIDA, Nairobi, Kenya
- **SWCMC:** Soil and Water Conservation Monitoring Center, MWR, Beijing, P. R. China
- **TSSRI:** Tajik Soil Science research Institute, Dushanbe, Tajikistan

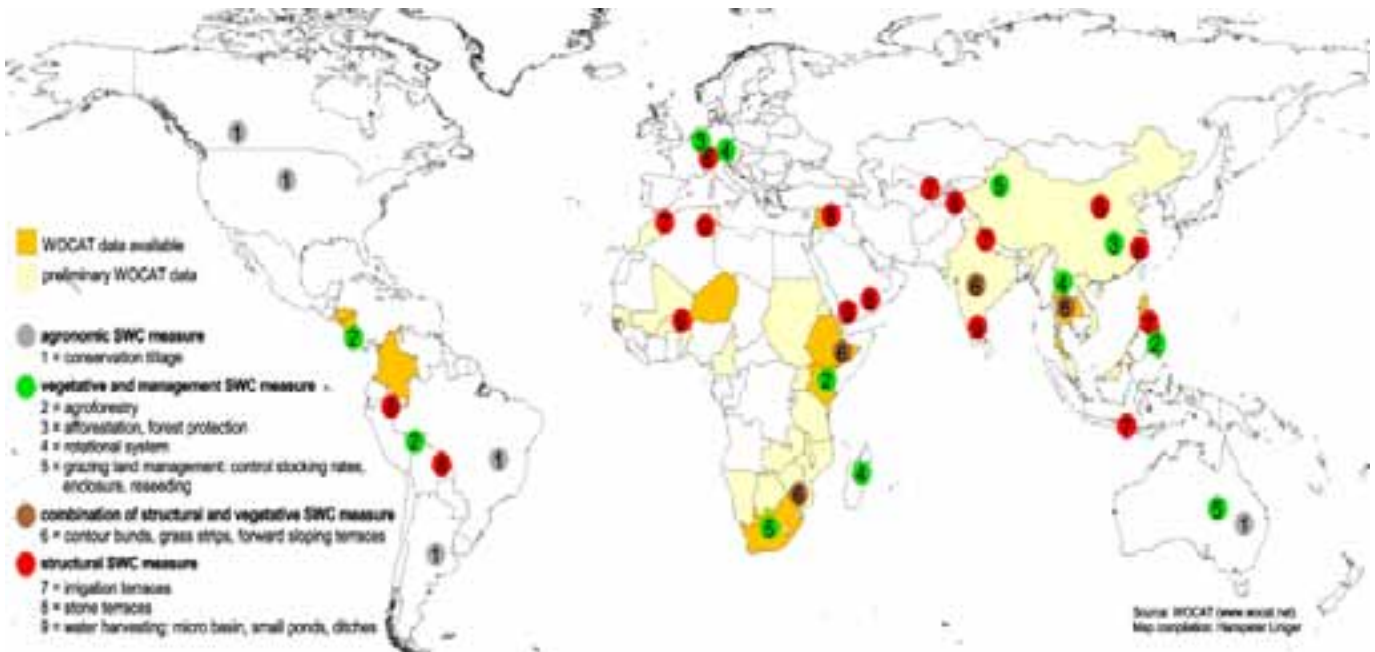


#### WOCAT Network 2004 (WOCAT 2005d, modified)

Indonesia is one of the member countries of ASOCON, and at the moment acts such as regional coordinator. This programme has the same basic objectives than WOCAT but just humid tropic Asian countries, and it has been at the basis of the involvement of Indonesia in WOCAT.

## Appendix III

### 2004 WOCAT World Map



On this map, Indonesia is referenced as “7: irrigation terraces”. This is not the result of the work done by the different provinces involved in WOCAT since 2001 but just of the work done on Bali.

Moreover, this province is not really involved in WOCAT - this evaluation comes from a special demand from the WOCAT Core Management Group, in particular, the Centre for Development and Environment in Bern (*appendix II*), to identify SWC technologies in Bali. Two irrigation terraces have been recognized, one in dry condition, and the other in wet condition, called “*Subak*”.

However, a broad variety of other SWC measures such as stone terraces, agroforestry, alley cropping, gully dams, and community forest have been identified but not yet entered into the WOCAT database for an international exchange (*WOCAT 2005e*).

## **Appendix IV**

### **Description of the three provinces studied (*strengths and weaknesses*)**

#### *1. West Java, Bandung area:*

At present, the staff are still identifying the SWC technologies in the province, but the main ones (approximately 10), such as Mangrove rehabilitation, stone terraces, and land rehabilitation have been put into the WOCAT database; but in Indonesian. They are waiting for “someone” to translate this information before putting their work on the Internet.

To identify the main technologies, they worked with a local NGO. However, the cooperation with other stakeholders at the provincial and district level is almost non-existent. At the field level however, the cooperation between different stakeholders, namely extension workers and land users, is really strong.

There are no extra funds to develop WOCAT, and no facilities such as GPS and the Internet, especially at the district and field level. Each scale knows about WOCAT, apart from land users who have never heard of the programme.

#### *2. DI Yogyakarta:*

In comparison with West Java, the staff have already identified all the SWC technologies in this province for different development projects, but not for WOCAT. They have GPS, and often use it, and more funds are available to go in the field. The organization from the province to the field level is really well developed, and cooperation with other stakeholders takes place regularly.

Moreover, at the field level, the same developed organization as West Java can be observed. They have an integrated approach, and each development project is realised with this vision. The problem in this province is due to staff turn-over, especially the head of office, who is not always able to continue the work of his predecessor. He does not always have the necessary information about WOCAT. It is easy to “forget” and to work on daily programmes with “funds” from the government. Moreover, the staff do not always have a forestry background and consequently are not qualified to do this work; explicitly, in the public sector, some placements are affected according to the number of year of experience rather than relevant background. Hence, someone with a medical background can definitely work in the ministry of forestry.

In addition, at the moment, the staff in place are not really convinced of the interest to implement a new programme such as WOCAT. They have no time, and they already work on development projects. For them, WOCAT is a project and they do not see it such as a system, a tool, a powerful source of information. They need to be educated like this and to understand the need to share international knowledge before they will become more involved in WOCAT.

### 3. Bali:

The staff have identified the traditional technologies, namely terraces. Currently, they are not working with WOCAT, although their work has been sent to the WOCAT core management group to put it on the Internet. The data were collected for the “overview book” which is currently under preparation by CDE. These data are not still available on the Internet but will appear very soon.

The organization, and strengths and weaknesses of this province are similar to Central Java. Moreover, WOCAT has never been mentioned in front of farmers.

## Appendix V

### **A country rich in SWC technologies: The beginning of *INDOCAT*...**

#### **1 Mangrove rehabilitation**





## 2 Dry paddy fields in Bali



## 3 Irrigated paddy fields in Bali: Subak



## 4 Gully dam in Central Java





## 5 Land reclamation



Central Java  
Traditional SWC technology



West Java  
Land reclamation on stones – Year 2



West Java  
Land reclamation on stones – Year 15

## 6 Agroforestry



## 7 Terraces



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