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WOTR

water gives life

PUBLICATION

Participatory Net Planning

A Practitioners Handbook

Crispino Lobo

About WOTR

Established in 1993 to undertake holistic and integrated development activies for poverty reduction in resource-fragile and rain-fed areas in India, Watershed Organization Trust (WOTR) is an NGO headquartered in Pune, Maharashtra, that actually helps make the water flow where there is none. This is done by organising rural communities to trap rainwater across the watershed they live in; conserve it and use it judiciously for domestic, agriculture and livelihood purposes.

The main focus areas of WOTR are capacity building of village groups and NGOs for participatory watershed development, integrated farming systems (agriculture, horticulture, livestock, organic farming, etc.), self help promotion, direct implementation of watershed projects, livelihood promotion, micro enterprise promotion, training and extension support for organisations and practitioners, development of concepts, pedagogies, training manuals, awareness generation tools and media aids, policy advocacy, documentation, knowledge capitalization, action research and publications.

WOTR Publication List

Sr. No.	Name of the Book	Language	Authors	Year of Publication
1	A Case Study of Naralewadi	English	Sujaya Dangwar and Sunil Agarwal	2009
2	Achieving Quality Results in Large Budget Short Term Developmental Projects	English	Ravi Deshpande and Marcella D'Souza	2009
3	A Comparative Study on the Energy Efficiency of the Smokeless Hot Water Chullah and the Traditional Chullah	English	J.R. Pawar	2009
4	Participatory Net Planning: Reflections and Learnings from the Field	English	Lalita Joshi & Ratna Huirem	2009
5	Facilitating Local Governance	English	Lalita Joshi	2009
6	लोकाभिमुख कारभाराच्या दिशेने... ग्रामसभा उपसमित्यांच्या कामकाजासाठी साधनसंच	Marathi	ललिता जोशी	2009
7	Panchayat Raj on the Ground Issues in Village-Level Panchayat Raj Operation	English	Ravi Deshpande and Dr. Marcella D'Souza	2009
8	जिल्हा परिषद व पंचायत समिती : रचना व कार्य	Marathi	थॉमस पलघडमल	2009
9	स्वायत्त व शक्तिशाली ग्रामपंचायत : रचना व कार्य	Marathi	थॉमस पलघडमल	2009
10	Making Sanitation A "Clean" Habit: Lessons from A School Sanitation Project	English	Dr. Marcella D'Souza, Alpana Bose and Prashant Tambe	2008
11	Impacts of Watershed Development Project Management through Labour and Machines: A Comparative Study of Two Villages In Maharashtra	English	Sandeep Jadhav, Dnyandev Talule	2008
12	पंचायतराज मालिका			
	लोकशाहीचे बलस्थान 'ग्रामसभा'	Marathi	थॉमस पलघडमल	2008
	७३ व्या घटना दुरुस्तीमुळे ग्रामपंचायतीच्या कारभारातील बदल	Marathi	थॉमस पलघडमल	2008
13	चिमणचारा	Marathi	Dr Marcella D'Souza & Savita Pinjan	2007
14	Participatory Monitoring and Evaluation Systems in Watershed Development	English	Crispino Lobo & Abraham Samuel	2005
15	Upscaling of Successful Experiences in the Mainstream Watershed Programme in India: Mechanisms, Instruments and Policy Considerations	English	WOTR, WASSAN, WDCU, PLF, MANAGE	2005
16	Measurement and Record System for Watershed Activities	English/ Marathi	WOTR	2000
17	Operations Manual – Guidelines For Operations in The Indo-German Watershed Development Programme	English	WOTR	1999
18	Little Drops of Water Make A Mighty Ocean	English/ Hindi/ Marathi	WOTR	1998
19	The Rain Decided To Help Us	English	Crispino Lobo and Gudrun Kochendorfer-Lucius	1995

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Crispino Lobo

YOU ARE IMPORTANT

Dear Reader,

Your valuable comments and suggestions will benefit us and the development sector.

Do help us.

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Foreword

This year, 2010, marks 15 years since WOTR conceived, developed and deployed the Participatory Net Planning Methodology, or PNP as it is popularly known.

PNP was born of the need to develop a practical, participation-promoting and inclusive methodology that is at the same time pedagogically and technically sound. The PNP methodology grew out of the Indo-German Watershed Development Program (IGWDP) in Maharashtra, India, and was adopted by all NGOs and watershed communities involved in it. Since then it has been widely disseminated across the country (and even, internationally) through thousands of training and capacity building events organized by WOTR[1].

Today the PNP approach has been adopted, albeit with local and project specific adaptations, by most major watershed development projects in the country[2]. It would indeed be no exaggeration to say that the PNP methodology has made a pioneering and singular contribution to the spread of community-led watershed development in India.

Over the years, during the thousands of training events conducted by WOTR, PNP was taught largely on a "hands-on" basis in the field supplemented by class room sessions during which printed material including Net Planning Formats were distributed to participants. Based on participant feedback, these Notes and Formats were continuously updated. This approach to capacity building is based on our belief that knowledge acquisition is learner-driven, dynamic and best internalized through an iterative process of "learning-by-doing".

A much repeated request from trainees and groups engaged in participatory watershed development was that this experience and pedagogy be documented and made available in a single volume so as to make it widely accessible.

This "do-it-yourself" Handbook is a response to this need. It has been written in a straightforward style; is self explanatory and can be easily used by anybody having a basic knowledge of land and water conservation. Explanatory notes and detailed guidelines have been included for all the Net Planning Formats supplemented by actual illustrative examples. In addition, a VCD has also been included to enable readers and development practitioners to see how PNP is actually conducted in the field.

We hope, dear reader and practitioner, you find this Handbook useful and an answer, at least in part, to some of the planning and project formulation challenges you face in the field. Please feel free to give us your

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1 The PNP methodology and approach is the brainchild of Crispino Lobo, then Program Coordinator of the IGWDP, co-founder and erstwhile Executive Director of WOTR. Together with his colleagues, notably, Dr. V. Tagat of NABARD, David Gandhi (erstwhile WOTR), Sandeep Jadhav, Prakash Keskar and Harish Daware of WOTR, the PNP process was developed and further refined over the years. Several others, from WOTR as well as trainees, have further shaped the approach and formats though sharing their experiences, their critiques and feedback.

2 Examples of these are the Drought Prone Area Program (DPAP) in Maharashtra, the Andhra Pradesh Rural Livelihoods Program in Andhra Pradesh (APRLP), the Rajiv Gandhi Watershed Mission in Madhya Pradesh and all watershed projects funded by the National Bank for Agriculture and Rural Development (NABARD), a major funder of watershed development in India.

feedback and point out any errors that may have crept in. Should you feel the need for additional support by way of trainings, clarifications or additional information, please do get in touch with us (info@wotr.org).

We would love to hear from you as it will help us refine the PNP methodology.

Dr. Marcella D'Souza
Executive Director (WOTR)

Introduction

Today PNP is a well known and widely adopted methodology for the planning and implementation of watershed development projects in India.

Developed and first deployed by WOTR in 1995, PNP has, over the course of the last 15 years, been adapted by its many users to suit local situations and project specific objectives. Nevertheless, its basic approach, structure and core content have remained remarkably intact. It would indeed be no exaggeration to say that the PNP methodology has made a pioneering and singular contribution to the spread of community-led watershed development in India[3].

As an approach and practice, PNP is a significant pedagogical and methodological tool that engages stakeholders in the development and management of their land and natural resources, especially within the framework of watershed development. It powerfully promotes transparency, women's empowerment, participatory planning, ownership building and knowledge acquisition at the watershed level while also delivering an implementable action plan that can be monitored by the community itself.

This Handbook is intended for development practitioners who face the challenge of actively involving communities in the regeneration and sustainable management of the watersheds they live in. Since watershed development is based on land, water and biomass rehabilitation and conservation, this Handbook is focused on how to involve stakeholders of these resources in their optimal development and sustainable utilization. It is practice oriented with a step-by-step detailing of what, and the manner in which it is to be done. The expected output is a detailed community owned and approved site and resource specific watershed development plan. The overall outcome is an informed and motivated community that will implement the plan, monitor it, maintain created assets and manage regenerated resources.

Structure of the Handbook

This Handbook consists of 6 Chapters.

Chapter 1 outlines the considerations, the context, reasons and compulsions that led WOTR to develop the PNP method of land, water and biomass resources development and husbandry.

Chapter 2 describes what PNP is all about, its objectives, underlying beliefs as well as its key elements.

Chapter 3 is practice oriented. It indicates the prerequisites necessary for successfully undertaking the PNP exercise, the concrete steps to be undertaken, the manner in which it is to be conducted, the precautions and sensitivities to be noted, the challenges likely to be faced and suggestions on how these can be addressed.

Chapter 4 deals with how information technology can be deployed in order to process the huge amount of data that is generated during the PNP exercise as well as

3 For example, the Drought Prone Area Program (DPAP) in Maharashtra, APRLP-DPAP (Andhra Pradesh Rural Livelihoods Program – DPAP) in Andhra Pradesh, all watershed development projects funded by NABARD; the Rajiv Gandhi Watershed Mission in Madhya Pradesh, to mention a few.

describes the various field-validated software packages that WOTR has developed and makes available for supporting PNP-based project planning, formulation, scrutiny, implementation and monitoring.

Chapter 5 draws upon a research study that canvassed the perceptions, opinions and observations of three sets of stakeholders – farmers, the Village Watershed Committees (VWCs) and NGOs – in 4 villages that had undertaken PNP exercise and had implemented watershed projects using the PNP generated action plan.

Chapter 6 consist of two identical sets of 6 Formats each which capture, organize, summarize and help analyse the collected data and information. The first set of Formats are blank, unfilled ones of which the first format, the foundational one, is the most important as it deals directly with the primary stakeholders. The second set of formats consists of "filled-in" illustrative examples of the blank formats in the first set. This latter set is intended to help the user get a feel of what is involved and how data is to be inputted. Detailed guidelines on filling up the Formats as well as supportive technical tables have been included.

A Video CD has been included which graphically illustrates in the field what PNP is all about and how it is to be undertaken.

The authors hope that readers and those interested in watershed development, will find this Handbook and its supportive VCD, a useful introduction to practical ways of quickly mobilizing communities to regenerate their local ecosystems and habitats in a comprehensive and integrated manner such that optimal and sustainable services and benefits flow to them over the long term.

1

Context and Origins of Participatory Net Planning (PNP)

In this Chapter, we shall explore the considerations, the context, reasons and compulsions that led WOTR to develop the PNP method of land, water and biomass resources development and husbandry.

The Context

Watershed Development can be sustainable only if all key stakeholders are part of the process and develop a strong sense of ownership in its success.

Development history has taught us that unless the target group (the primary stakeholders) or beneficiaries are actively involved and "own" an initiative or project, that intervention will likely not be sustained, more so, if substantial resources have been invested in it. Hence, obtaining people's active participation and ownership of the project at all stages (from acceptance of the project, through planning, implementation, monitoring, evaluation and its ongoing maintenance) is the key to the success of any developmental intervention.

This challenge is especially so while implementing a land based intervention such as watershed development, where the treatment on any piece of land immediately affects those adjoining it, those downstream and also impacts the overall outcome.

A watershed project is very much like a mosaic. In a mosaic, each piece is different from its neighbor though related to it; has its own specific place; and together with the other pieces, helps complete the design and picture.

Similarly, in a watershed development intervention, every piece of land and connected with the others and contributes to the overall outcome. It is therefore important to treat every piece of land beginning from the ridge down to the valley so that water that is gushing is made to run; running water made to walk; walking water made to stop and stand where it permeates the soil, recharges the ground water aquifers and is available for use. For only then would the watershed and its ecosystem be regenerated and yield its full potential.

In agrarian communities, this presents quite a challenge since nearly all resources – land, water and biomass – are already laid claim to, either by ownership or use. And the majority of people living in these rural communities depend on land and access to natural resources for their sustenance and livelihoods. Hence any activity that affects current land use practices and access to natural resources is a matter of serious interest and concern to the villagers and the various stakeholders.

Since integrated watershed development necessarily involves amelioration measures, changes in land use as well as development and management of natural resources, the consent and "buy-in" of most, if not all, of the primary stakeholders have to be secured before such a project can be successfully implemented.

New Ways of Securing Buy-In and Technology Transfer

The Watershed Organization Trust (WOTR), established in 1993, is engaged in reducing

Box 1: A Note on Watershed Development

A Watershed can be defined as the drainage basin or catchment area of a particular stream or river. As rain falls, it gushes down the hills, along sloping lands. It collects into rills, rivulets and brooks as the water rushes down and finally gathers into streams and rivers. The watershed refers to the area above any point on a stream/ river which feeds water into it. A watershed may vary from a few hectares to several thousands of hectares such as the Himalayan watersheds. Watersheds are naturally occurring geographically units defined by hydrological flows which consist of nested hierarchies of dynamically interacting ecosystems.

A watershed is not only a geographical area, but also a living space. It is basically the area of survival of the community living within it and drawing its sustenance from it. There is a direct symbiotic relationship between the robustness and vitality of the local ecosystem and the quality of life of the people living therein, especially in resource fragile regions. A degraded environment eventually leads to significant reduction in the availability of water, food, fodder, fuel for cooking and fibres for household consumption and economic production thus leading to hardships, pauperization and migration. Women, in particularly, have had to bear the brunt of these adverse impacts.

The World Resources Report 2008 convincingly argued that "ecosystems can become the focus of a powerful model for nature-based enterprise that delivers continuing economic and social benefits to the poor, even as it improves the natural resource base" (WRR, 2008, Ch. 1, pg. 3). Ecosystems are embedded in watersheds, which are geographically based hydrological units.

Essentially, watershed and ecosystems-based interventions revitalize the environment, enhance the capture and storage of rain water and stabilize the production base of the village economy, which in turn results in increased availability of water and food, and livelihood and quality-of-life needs of the community being met on a sustainable basis. Such an approach also increases the "staying capacity" of crops and livestock in times of drought and strengthens the capacity of the community to adapt to local climatic variations.

poverty in semi arid and resource fragile regions. Its focus has been to mobilize rural communities to harvest rainwater wherever it falls, across the watersheds they live in, and regenerate the ecosystem therein. This nature-based, community led approach has been adopted because the social and economic well-being of agrarian communities is usually directly proportional to the quantity, quality and range of services that the ecosystem and watersheds they live in can provide.

WOTR was established within the context of the Indo-German Watershed Development Program (IGWDP), a large scale bilaterally funded watershed development program in the state of Maharashtra.

Its mandate was to create a "people's movement for watershed development", within Maharashtra and elsewhere in the country.

There were however two major constraints that had to be overcome – the fact that there were extremely few NGOs who had any competencies in participatory watershed development at the time and secondly, the conventional methodology followed for planning (and formulation) of a watershed project did not sufficiently elicit nor incentivize the involvement and participation of the local community and the various stakeholders. These two challenges had to be addressed in order to ensure successful up-scaling of the program as well as sustainability of the watershed projects at the local level.

BOX 2: WOTR and the Indo-German Watershed Development Program (IGWDP)

The Indo German Watershed Development Program (IGWDP) is a large scale watershed development program that was conceived by Fr. Hermann Bacher and launched in Maharashtra in 1989. Its purpose is poverty reduction through community- led environmental regeneration along watershed lines.

It is funded by the German Government and involves on the German side the German Bank for Development (KFW) and the German Agency for Technical Cooperation (GTZ). On the Indian side, it involves NABARD and WOTR, the latter which, even though an NGO, was accorded an official status by the Government of India thus allowing it to receive official development assistance directly.

In order to progress the IGWDP, WOTR was set up in 1993 with the mandate to rapidly upscale the program, develop a capacity building methodology, develop the necessary training programs and knowledge products, disseminate information widely and engage with the policy establishment in order to secure an enabling policy framework for country-wide large scale replication.

The Capacity Building Pedagogy (the POP, GO-POP, PNP) developed by WOTR has enabled the IGWDP to grow from only 7 NGOs and approximately 16,000 hectares in 1992 to 88 NGOs covering over 221,000 hectares as on December 2010.

In addition, the Capacity Building Phase (CBP) as a pre-qualification for entering into full implementation has been adopted by all major programs in the country today. PNP as a planning, mobilisation and project formulation methodology (adapted to local situations) has now been adopted by most major watershed projects in the country.

Faced with this situation, WOTR developed and deployed in 1995, together with its partners, two new systemic approaches:

i) a rigorous capacity building pedagogy, called the Participatory Operational Pedagogy (POP)[4] which included the Gender Oriented Participatory Operational Pedagogy (GO-POP)[5].

ii) an effective and inclusive planning methodology called the Participatory Net Planning Methodology (PNP).

This book focuses only on the Participatory Net Planning Methodology (PNP).

Prior to PNP, the technique most widely used for planning and designing watershed interventions, as also in the initial years of the IGWDP, was a method known as "Gross Planning".

"Gross Planning" is basically a macro-planning approach which is prescriptive, extrapolative and makes broad recommendations based on technical parameters, largely independent of the specificities of individual land holdings or the needs of the stakeholders.

It involves use of surveying equipment for contour mapping of the watershed on the basis of which the slope of the particular field or area, the average slope of the terrain as well as the drainage pattern of the watershed is determined. Thereafter, other data like soil texture, soil depth and erosion status are collected on a sample basis, which, together with the slope data is used to determine the overall land capability classification of the watershed. There are 8 land classes in general. Land that falls in the

4 The POP is a systematic step-by-step approach to building up the capacities of NGOs and Village Self Help Groups (VSHGs) to undertake watershed development. The POP has been recognized as a powerful tool for up scaling and managing large-scale programmes

5 The GO-POP focuses on empowering and mainstreaming women in the decision making processes of the project as well as in the institutional life of the village.

first four classes can grow crops and the remaining four classes represent wastelands which may or may not be cultivable. Once this is done, the most suitable land use for a particular land class is decided together, with the appropriate mechanical and vegetative measures for *in-situ* soil and water conservation based on current technical knowledge. This template is then extrapolated across the entire watershed for all similar classes of land. Indigenous knowledge is generally not taken into consideration.

In the entire planning process, the farmer is usually never consulted in spite of the fact that the land on which the work is to be carried out belongs to him. This primary stakeholder is presented with a fait accompli of measures that are determined in accordance with current scientific wisdom, not according to their suitability to the individual farmer's needs or even the specific requirements of his land. A consequence is that Gross Planning does not inculcate a sense of ownership.

As a result, when the "scientifically correct" plan is being implemented, serious difficulties arise as the farmers or stakeholders have a different perception of what ought to be done. Since the stakeholders have not been taken into confidence, they often do not allow the proposed measures to be implemented on their lands. Work is often stopped and disputes arise. More importantly, since there is no sense of involvement, ownership or personal stake, the structures and measures undertaken are rarely, if at all, maintained post project implementation, thus seriously compromising the sustainability of the project. This explains why most projects, despite substantial funding and "rigorous planning", either "fail" or deliver disappointing outcomes.

In order to address these drawbacks, especially in regard to addressing stakeholder sensibilities and locale-specific requirements, while at the same time exposing the stakeholders to proven best practices, WOTR developed the Participatory Net Planning Methodology (PNP).

The following chapter discusses the basic concepts and key elements of the PNP methodology.

2

The Concept and Key Elements of Participatory Net Planning

What is Participatory Net Planning?

Participatory Net Planning (PNP) is a methodology and a tool that actively involves landowners and other stakeholders in the planning and implementation of measures – land use, soil conservation, water harvesting and biomass development – that regenerate the ecosystems and watersheds they live in.

It focuses primarily on site and locale-specific resource management and is concerned with the conservation, productivity enhancement and sustainable management of all natural and biotic resources in the watershed. The specific characteristics and current use of each land, water and vegetation resource are assessed and detailed plans together with costs and time lines to realize the desired outputs are worked out.

By its very nature, PNP also serves as a mobilization, training and monitoring tool that is also invaluable for evaluation purposes.

Objectives

The objectives of PNP are as follows:

i) Secure ownership and "buy-in" amongst land owners and the various stakeholders in a particular watershed so as to enhance sustainability of the works undertaken.

ii) Plan for measures that are tailored to site requirements, address stakeholder needs and increase productivity.

iii) Formulate proposals – activities, budgets and time lines – that are realistically implementable and result in minimal divergence between what was planned for and what is actually realized. From the perspective of a program, this is necessary in order to make realistic projections and financial allocations with a view to up-scaling.

The Approach

The PNP methodology puts the stakeholder at the centre of the process. This is achieved by involving the landowner/farmer household (all adult men and women of the household, as far as possible) or users (as in the case of Common Property Resources – CPRs) in the planning and decision-making process specific to the land or CPR in question.

At the time of undertaking PNP, each landholding or CPR is visited by the planning team[6] together with concerned stakeholders and this exercise is conducted on-site. The land/CPR is jointly surveyed and assessed. The views of the stakeholders regarding current and proposed land use and the soil and water conservation treatments necessary to be undertaken in order to realize desired benefits, are elicited. They are then engaged in a dialogue wherein they are introduced to best practices and scientific knowledge pertaining to land husbandry and various possible interventions and their purpose and potential are discussed and agreed upon. The final word in regard to measures to be

6 Consisting usually of NGO personnel (an engineer/agronomist/technical person who may also be supported by a community organiser/women social worker, as needed) together with some members of the Village Watershed Committee (VWC)/Village Development Committee (VDC).

undertaken rests with the stakeholder, except in the case where it is would adversely affect the neighbors, surrounding lands/ CPRs or result in damages elsewhere. In this case, attempts are made to convince the stakeholder, failing which no treatments are taken on the concerned land or CPR. Once consensus and agreement has been secured, the "understanding" – proposed interventions and treatments – are finalized in writing and also sketched out on a diagram or map of the concerned parcel of land or CPR, as applicable.

PNP is also gender inclusive. Men and women are both involved in the planning and formulation process. PNP is preferably undertaken when the "farmer couple or land owning couple[7]" is present on their lands at the time of the planning even in the case where land ownership is in the man's name only.

When PNP is done for Common Property Resources (CPRs), where the landless poor, marginal farmers, small livestock owners and the shepherd communities are the primary stakeholders, then the Village Watershed Committee (VWC)[8] or the Village Development Committee (VDC), as the case may be, and the Gram Panchayat (GP)[9] are also involved. This is necessary in order to address concerns of equitable access, compensatory arrangements in case of loss of access, resolve conflicts and establish effective, transparent and representative institutional arrangements for sustainable management of the CPRs and created assets.

The Participatory Net Plan[10] is not just a document for planning and sanction. It is also and primarily meant to be a blueprint for implementation. It is written in the local language so that is it understandable to the stakeholders and can be referred to whenever required. The Net Plan is therefore flexible and should be viewed as an on-going "work in progress". As the project evolves, new "facts" may arise which call for revisiting previously planned interventions; or stakeholders may change their preferences. In these events, the Participatory Net Plan should be accordingly modified to reflect these new realities. The Net Plan is thus a "living document" that is flexible and which facilitates transparency, on-going monitoring and accountability.

The PNP methodology thus promotes mutual learning, incorporation of indigenous technologies as well as the experiences, knowledge and concerns of the various stakeholders and results in the determination of appropriate and site-specific treatments and measures. It thus fosters transparency and ownership, minimizes the potential for conflicts, supports smooth implementation of the planned measures and enhances the sustainability of the treatments and measures undertaken. And it also allows for accurate monitoring and tracking of measures planned and implemented[11].

The Experience of Participatory Net Planning (PNP)

Every watershed project implemented by WOTR, as well as in the IGWDP-Maharashtra, goes through 2 phases – the Capacity Building Phase (CBP) and the Development

7 Where the wife is not present, then the involvement of the concerned responsible woman of the household is actively sought in determining interventions.

8 The VWC (Village Watershed Committee) is a body nominated (not elected) by the Gram Sabha (this consists of all adult voting members of the village) which consists of representatives of all social and economic groups in the village as well as the different geographical areas in the watershed.

9 The GP (Gram Panchayat or Village Council) is the constitutionally mandated local self government body which consists of elected members of the village.

10 This document or proposal is the outcome of the Participatory Net Planning exercise.

11 This paragraph and the section following is adapted from the Research Report, "Participatory Net Planning: Reflections and Learnings from the Field", by Lalita Joshi and Ratna Hiurem, Ch. 2, pgs. 17-19. Both Chapters 1 and 2 of this Report were written by the principle author of the present book, Crispino Lobo.

Phase (DP)[12]. Only when a project meets the "qualifying criteria" and is deemed to have successfully completed the CBP (usually lasting between 6-12 months since initiation and including one rainy season), it moves into the Development Phase (DP) where work on a large scale across the entire watershed is begun.

During the CBP phase of WOTR – implemented projects, a small micro watershed (100-250 hectares), preferably near the main habitation of the village is selected for treatment and a PNP exercise for a small area (30-50 ha) within this micro watershed is undertaken. Work is begun and when this area is treated, another area within the same micro-watershed is similarly planned for and treated. Thus, depending upon the progress of implementation, the extent of participation and the size of the micro-watersheds chosen, as many as 3-6 small PNP exercises will have been undertaken and micro Net Plans prepared before the project moves into the Development Phase (DP)[13]. At the start of the DP, a PNP exercise across the entire remaining area of the watershed is undertaken which results in the formulation of a comprehensive and implementation-oriented Net Plan.

This iterative process of conducting PNP exercises (or PNPs) is premised on the principle of "learning by doing". When the people begin to implement what they have planned, they begin to see and understand what it means; when they see the impacts of their actions (the bunds retaining water, the crops looking healthier and producing more, the increase in the water table, etc) they understand what watershed development is all about, what it entails, and above all, they realize the crucial necessity of being fully involved in determining what must be done (and implemented) in order to enjoy optimum benefits on a sustainable basis. Hence, PNP and the benefits or impacts that follow from implementing the Net Plan are inextricably intertwined and mutually reinforcing.

In the following chapter we shall concretely describe how a PNP exercise is actually undertaken, the facilitating prerequisites, the composition of the planning team, the challenges likely to be faced and offer suggestions on how these can be addressed.

12 In the IGWDP, this is known as the Full Implementation Phase (FIP).

13 In the IGWDP, only one PNP exercise is undertaken and a Net Plan is prepared for the entire micro watershed of 100-250 ha.

3

How to undertake PNP: Prerequisites, Steps and Challenges

Pre-requisites for effectively conducting PNP

Prior to undertaking PNP, it is important that certain conditions and prerequisites be complied with in order for the exercise to achieve the desired results.

Some key requirements are as follows:

i. **Adequate Community Awareness and Mobilization:**
The community should have been made fully aware of what watershed development is all about, have expressed their willingness to implement it and have agreed to abide by consensually arrived at norms and management regimes (such as own contribution, ban on free grazing in treated areas or controlled grazing as the case may be, ban on water consumptive crops, etc). PNP can only be undertaken once this common will and purpose has been achieved.

ii. **Setting up a Planning Team:**
The team that undertakes PNP should consist of a technical expert or a person experienced in the field of watershed development[14] and a minimum of 2-3 members of the Village Watershed Committee (VWC)/Village Development Committee (VDC), as the case may be. It has also been found useful, where needed, to also involve a person skilled in social communications or a community organizer together with a woman social worker[15]. This team engages with the farmers/stakeholders and discusses with them the appropriate land use and ameliorative measures to be undertaken on their landholdings or CPRs.

The presence of 2-3 VWC/VDC members is very essential as it provides the stakeholders with a sense of assurance. Being local residents, but they too have a stake in the success of the project (as they too are beneficiaries) and they can always be got back to in case of problems arising later. These local representatives are very helpful in motivating the villagers/stakeholders undertake the proposed land husbandry measures. A dividend that is often realized is that by participating in this process, these VWC/VDC members themselves begin to get a deeper appreciation of their own village's resources and potential as well as a better understanding of what watershed development is all about.

Since PNP is a time intensive effort (on average, one team can cover 10-25 ha per day), in order to accelerate the process of planning and cover large areas in a short period of time, it would be necessary to field more than one team.

iii. **Availability of Gat/Survey number Cadastral Map and Land Records:**
It is necessary to have proper land and ownership records of the area where PNP is proposed to be undertaken[16]. This is important since PNP is site and locale specific and the locations and ownership of all parcels of land and CPRs should be clearly identifiable. It should be noted

14 Preferably an agronomist/agricultural engineer/water resources engineer or anybody familiar with soil and water conservation techniques.

15 The role of a woman social worker is to help women stakeholders participate in the discussions and ensure that their voices are heard.

16 These are available with the Talathi.

that a farmer may own land in more than one Gat (Survey) number. Similarly one Gat (Survey) may comprise of fields of more than one farmer.

Diagram 1 on pg 22 is an example of a Cadastral Map of a village.

iv. Demarcation of Gat-number Boundaries: Quite often, using the cadastal map, it is difficult to locate on the ground the actual spot that the particular gat/survey number represents. This is because of either inherent errors in the map or changes in identification points on the ground since the time the map was prepared. This latter happens because of division or consolidation of land holdings[17] with the resulting changes in identification points/ physical structures or, in the case of CPRs, changes in land use or ownership. It is important to identify exactly the land or CPRs that the gat/survey numbers refer to; and where changes have occurred, to note the same and correct the cadastral map accordingly.

Identification and demarcation of each parcel of land or CPR on the field can be done with the help of the village elders, or the Sarpanch, the Police Patil, the land owners/stakeholders themselves or any other villager generally familiar with the location and ownership pattern of the area. This can be done either at the time the PNP is conducted, or in the case of gross inaccuracies or significant changes, prior to conducting the PNP.

v. Prior Intimation to the Concerned Farmers: If the landowning farmer couples/ stakeholders of a particular area where PNP is proposed to be undertaken on a particular day are expected to be present for the exercise on that day, then it is necessary to inform them at least 2 days in advance. This can be done in a number of ways viz., by announcing the names of the concerned farmers over the local public address system, by house-to-house intimation, by word-of-mouth, at village meetings, etc.

vi. Adequate Provisioning of Time for PNP: PNP is intensive and time consuming and only a limited area can be covered by each team in a day. On an average, about 10-25 hectares can be covered each day. Hence PNP should be initiated well before the deadline for beginning of actual implementation of measures. Sufficient time should be given to having adequate discussions and interactions with the stakeholders because their "buy-in" is the key to smooth implementation of measures as also their sustainability. It is thus a valuable investment towards realising the project's success.

vii. Training of NGO Technical Staff, VWC Members and Field Supervisors: It is important that the personnel who will undertake PNP be well trained in how it is to be conducted and what the key aspects are. They should also be prepared for objections that the farmers/stakeholders may raise and have suitable responses ready. An often encountered objection raised by farmers to earthen works (bunds, contour bunds, etc.) is the loss of cultivable lands to these structures. This can be countered, for example, by pointing to productivity gains which result from increased in-situ moisture conservation which would more than compensate for the reduction in cultivable area. Moreover, the bunds can be used to raise grasses and fodder.

VWC members play an important role in convincing farmers/stakeholders regarding treatments and measures to be undertaken. It is thereof necessary that they understand thoroughly the concept and practice of PNP. In order to familiarize them with the PNP approach, it is necessary to conduct a Demo-PNP exercise for VWC members in a small area, prior to conducting the full-scale PNP exercise in the village.

17 This can happen due to property division amongst heirs or change of ownership following a sale or even acquisition by public authorities.

It is important to identify local youth from the project area who should be thoroughly trained in conducting PNP. This not only reduces the personnel and work load of the facilitating agency (NGO/PIA) but also increases the ownership stakes of the villagers in the project. A pool of locally available skills is created; the villagers see their youth directly benefitting in terms of knowledge, skills acquisition and income and, equally importantly, they feel respected and their knowledge acknowledged.

viii. Flexibility in Project Design:

Often, the views and demands of the farmers/stakeholders may not appear technically appropriate. It should be remembered that the final word in regard to treatments to be undertaken, however, lies with the stakeholder/farmer and their views should be accepted and incorporated in the plan except where it is may lead to damage or loss, especially to others. In this case, attempts should be made to convince the farmer/stakeholder. If the stakeholder isn't willing to change his/her views, then it is advisable not to undertake the treatments on that piece of land[18] or undertake only those that are feasible and to which the stakeholder is agreeable, even if they are less than optimal.

Sanctioning authorities should be willing to accept a plan that may include "gaps" in overall treatments as well as less-than-optimal technical solutions in the interest of sustainability of the project.

ix. Availability of Necessary Equipment:

It is necessary to have a full set of equipment before one goes into the field. The minimum items required are: Net Plan Format No. 1 applicable at the Farmer/ Stakeholder level[19]; an abney level or clinometer or hydro marker to measure slope of the land, identify contour lines as length of likely contour bunds; a measuring tape; a rope to trace out structures or items that are hard to measure directly; a screw auger/pick-axe; water for determination of soil texture; revenue or cadastral map; Gat/Survey number wise land records; pocket calculator; pencils/ erasers/sketch pens, writing board with clip and sufficient paper.

Steps to Conduct PNP in the Field.

i. Information Dissemination and Work Schedule Fixing:

First conduct a Gram Sabha and inform the villagers what is to be done and when. Also explain the reasons for undertaking the exercise in the way intended. This is important because it is a marked departure from the way planning for watershed projects is usually done and the villagers may wonder as to why this kind of, that would require the active involvement of key persons in their household in terms of on-site presence, time and dialogue.

Also insist that all those interested in participating in the project and having their voice considered should be compulsorily present in the Gram Sabha. While it is inevitable that some will still fail to show up (and they should, nevertheless, also be included in the PNP exercise), we have found that putting this condition does ensure a good turnout.

ii. On-Site Presence of all key stakeholders (especially women):

At the time of conducting the PNP, ensure, as far as possible, that the farmer household (all adult men and women of the household) whose land is to be surveyed and planned for or the stakeholders/users, as in the case of the CPRs, are present on the site. The process for conducting PNP on private lands or CPRs is the same.

18 Usually, once the impacts of the works undertaken are seen, the recalcitrant or dissenting stakeholders come on board and demand that their lands also be treated.

19 Refer to Chapter 6.

iii. **Dialogue and Mutual Learning:**
Build a rapport with those present and put them at ease while informally discussing with them the details of the land or resource e.g., the direction of the flow of the rainwater, the degree of erosion, type of land, types of crops that can be taken up, potentials and limitations of the resource, types of plantations, management regimes, etc.

iv. **Land Classification:**
Then measure the slope of the land; take the depth of the soil using an auger or pick axe/shovel and observe the soil texture and erosion status of the field. Depending on these factors, classify the land according to the standard classification (8 classes of land).Take care to explain to the owners/stakeholders the importance of these details and the reasons you are considering them.

v. **Building Consensus around Treatments:**
Once the land is classified, then propose to those present the most suitable land use and possible treatments. It does often happen that the farmer/user is completely unwilling to accept the suggestions given. The team, the technical person and especially the VWC/VDC members, must try to convince the stakeholders, explaining the reasons behind every proposal. One must be prepared to accept less-than-the-ideal option in the interest of ensuring buy-in. There will be some give and take and the PNP team must be prepared to reconcile to the best acceptable solution under the given circumstance. The land owners/ stakeholders, generally, should have the final word. However, no treatment should be accepted, even if strongly insisted upon by the stakeholder, if it is unfeasible and will lead to adverse consequences to others[20]. In this case, one should be prepared to leave the parcel of land/ CPR untreated and move on to the next.

In case of CPRs, where there is a dispute that has wider ramifications, it may be necessary to involve the wider community or the Gram Panchayat in resolving it.

When owners are not living in the village, they can be contacted through their neighbours or representatives and requested to be present. If presence is not possible, then their consent in principle should be obtained.

vi. **Visualization:**
During this process the team should help the farmer household/stakeholder visualize how the treatments or proposed land use would help solve the existing problems on their land or increase its productivity; the transformation that will likely take place once treatments are implemented and the benefits that will likely be obtained. This visualization has been found useful in motivating people to change traditional ways of doing things and acquire new perspectives.

This is particularly true in the case of CPRs. PNP for CPRs is an opportunity for the village to consider the needs of its most vulnerable members – the poor landless, small and marginal land holders, widows and shepherd communities – who are often dependent on these. These groups are usually left out of the process and discussions, while at the same time they are very important stakeholders. The sustainability of the CPRs depends of them. And proper management of certain CPRs (such as water bodies, percolation tanks, grasslands and forests, etc.) is essential as they benefit the community at large. The PNP can thus become an occasion to bring to the community's awareness the concerns and issues of the marginalized and to work out compensatory mechanisms, where applicable. By engaging with these user groups during the PNP, the community acknowledges their stake in the CPRs and incentivizes them to ensure their development, conservation and sustainability.

20 Sometimes, it may be necessary to accept an unfeasible demand provided it doesn't result in negative impacts on others and isn't too costly. In this case, the own contribution of the stakeholder may be increased.

vii. Documenting Status and Proposed Interventions:

Once a consensus has been arrived at regarding the proposed treatments and land use, all the information should be noted in the Net Planning Format No. 1 which is available in Chapter 6. This includes details of the present and the proposed treatments e.g., land use, types of horticulture plants, species of trees, number of trees, etc. Actual measurements/numeration of existing and proposed interventions should be done so as to determine location of measures, amount of work to be done and to calculate costs. This also forms the basis for calculating the "own contribution" of the stakeholders which can be informally discussed with the stake holders on site.

viii. Formalizing Agreements:

At the end of this exercise, the agreed upon proposed treatments are hand drawn on a diagram of the concerned survey/gat number/CPR (which may or may not include existing structures/ measures[21]) using different colored pens/ markers to differentiate between them. This diagram is drawn in the space reserved for it on Format 1. Where feasible (and preferably), a copy of the same may be given to the concerned stakeholder. The head of the farmer household/principal stakeholder then gives his/her written consent to the proposed actions on Format 1 itself. This agreement formalizes the consent of the stakeholders to undertake and maintain the proposed treatments.

An example of such a representation is indicated in Diagrams 2 and 3 on page 23. Another example is available in Chapter 6/Section 2/page 84.

ix. Obtaining Public Endorsement:

Once the PNP for the entire village has been completed, a Gram Sabha should be called and the results, namely, proposed treatments and interventions should be put before them, discussed and validated. Any changes suggested and consensually agreed upon, especially in regards to the CPRs, should be incorporated and the net Plan finalized. A Gram Sabha resolution to that effect should be taken and the same entered into the proceedings of the Gram Panchayat. This process gives validity and legitimacy to the Net Plan in the eyes of the community, thus making implementation of it that much the easier.

21 Additionally, if required, though not necessarily, a land capability map may also be drawn.

Challenges Encountered

Land, water and natural resources are sensitive issues in agrarian communities because their sustenance and livelihoods are largely dependent on them. Moreover, underlying this, are power relationships and entrenched interests that shape social and institutional arrangements that determine who benefits and who gets excluded.

Thus, when one proposes changes to the established or "accepted" ways of resource use and access, there could be opposition or resistance from groups who benefit from the status quo.

One must be prepared to face this and one must also realize that apart from presenting a convincing case for a proposed action (and one must assiduously prepare oneself for this), often, the opposition can only be countered when the majority in a community decide that change is in their best interests. This means that intense social mobilization and community-wide "buy-in" should precede the undertaking of a PNP exercise. In fact, it is the precondition and key to successful planning and implementation of a watershed project.

Some of the challenges frequently encountered are as follows:

i. **Farmers initially agree and then backtrack during implementation:**
The reason often is that either sufficient time and attention had not been given for resolving their difficulties and addressing their needs, or social and technical aspects have not been adequately addressed at the time of doing the Net Plan.

This situation can be prevented by ensuring that there is clear communication and understanding between the farmer household/stakeholder and the planning team who should constantly re-check with the stakeholders whether they have understood the issues and are comfortable with the proposed solutions. For example, while most farmers are hesitant to permit contour bunds, it often helps to actually mark out a contour line on the field using the contour marker/abney level and lime and then discussing the possibility or benefits of situating a bund on the line out. This helps start a meaningful and concrete dialogue.

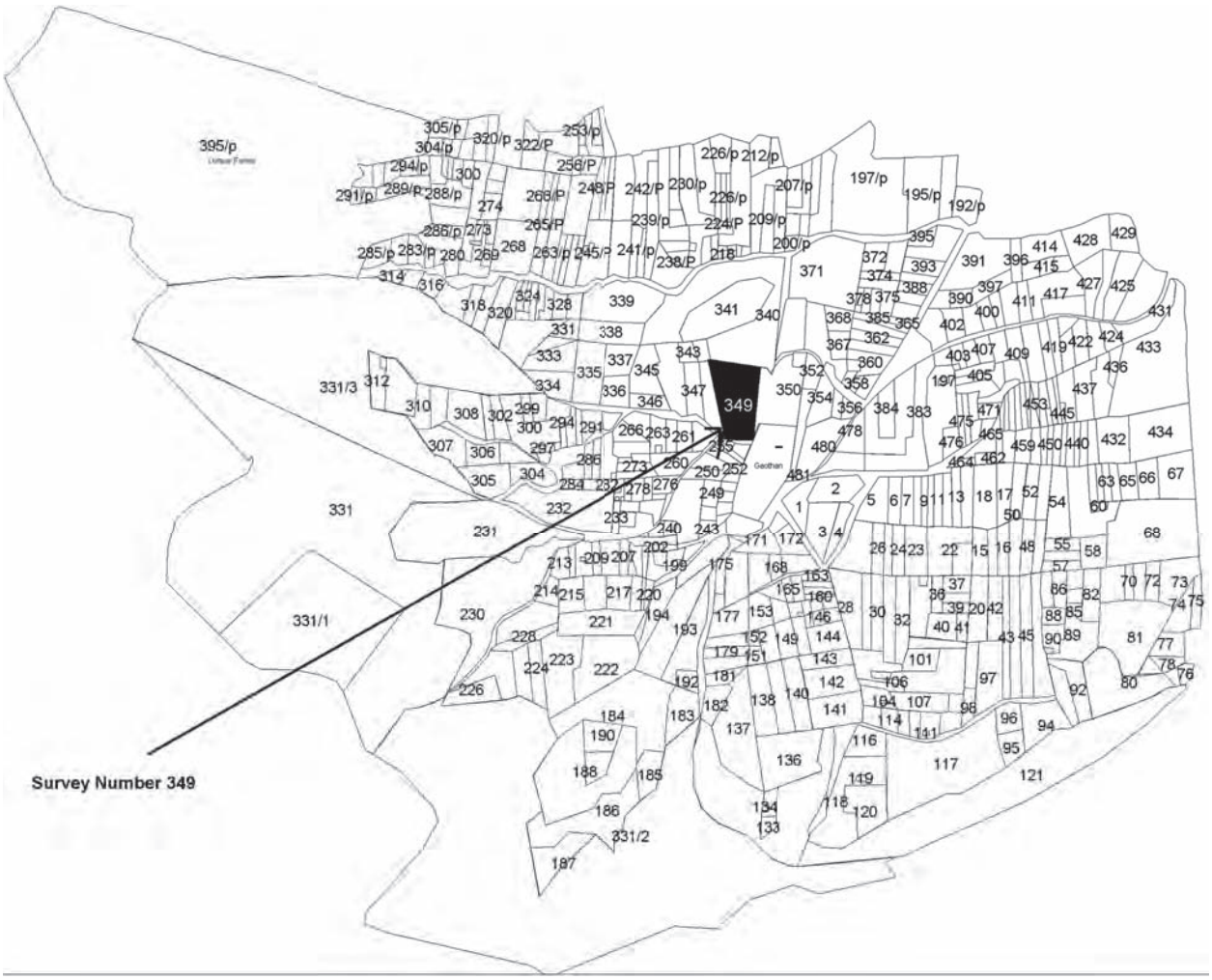
Even then, it can happen that farmers/ stakeholders can change their mind at the time of implementation. At this point, one must re-engage with them to address their new concerns. It is helpful to always have members of the VWC present on these occasions as they are from the same village and background, know and understand the culture and local imperatives and generally would enjoy a greater reservoir of trust than "outsiders", however technically competent.

ii. **Family Disputes:**
In case there are several brothers or cultivators tilling or owning an undivided parcel of land, for example, and the landholding is small, generally, only one brother, usually the eldest, takes decisions on everyone's behalf. However, at the time of implementation, sometimes, conflicts arise amongst the brothers with regard to the decisions taken. By necessarily insisting on involving each landowner or cultivator, PNP greatly reduces such untoward incidents.

iii. **Exclusion of Women:**
For a variety of reasons, women are quite often excluded from the on-site PNP process. The PNP team should insist that women of the household are present and to proceed with the PNP only when they are present. This is particularly important from the perspective of sustainability of treatments undertaken because most of the on-farm work as well as accessing of CRPs is done by women. Moreover, they prioritize family needs and food security as opposed to cash crops which are preferred by men. Women should be motivated to participate actively. Self Help Groups are an effective forum to promote their participation.

An example of a Cadastral Map of a Village

Diagram 1



Note: (i) The numbers indicate Survey/Gat numbers
(ii) Survey No./Gat No. 349 measuring 1.73 ha is taken up as an illustrative example

Diagram 2: Existing infrastructure/measures on Survey/Gat No. 349
Present Land Use: Agriculture

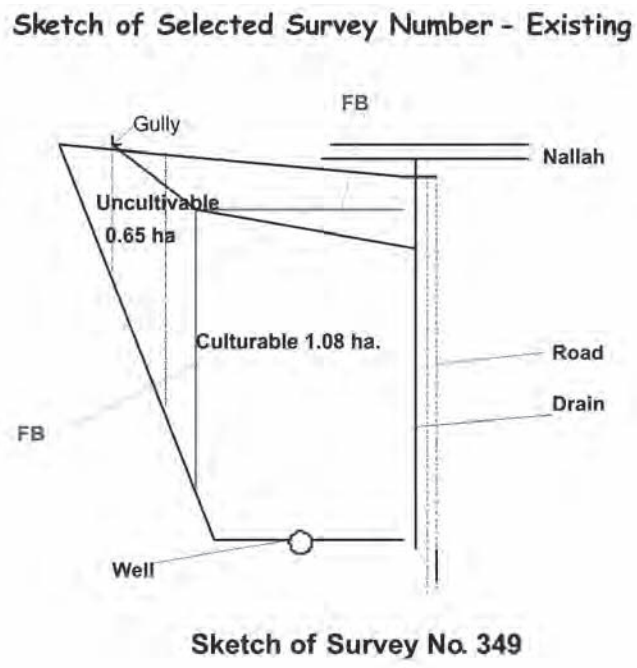
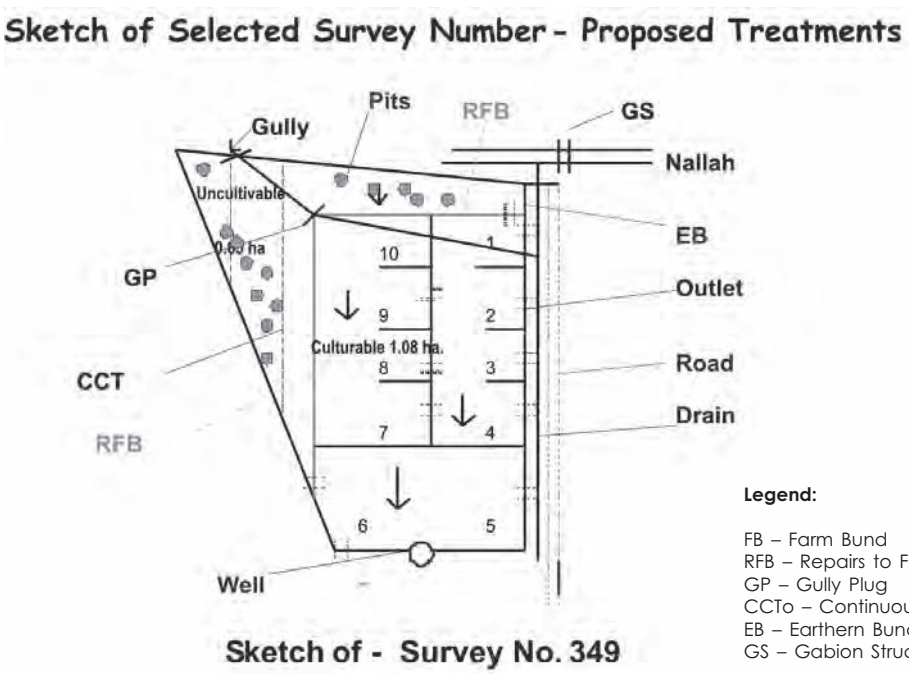


Diagram 3: Proposed Treatments together with Existing Measures
Proposed Land Use: Agro-Horticulture or Agro-forestry.



Legend:

FB – Farm Bund
RFB – Repairs to Farm Bund
GP – Gully Plug
CCTo – Continuous Contour Trench
EB – Earthern Bund
GS – Gabion Structure

4

Management Information Systems and PNP

The Need for Technology-enabled Documenting, Reporting and Management Systems

PNP involves the collection of significant amounts of land parcel-wise (Survey/Gat number wise) data regarding land capability, current and proposed land use, existing measures and infrastructure, proposed treatments, estimated cost of developing the land/CPRs and farmer/user contributions. This data has to be harmonized, systematized, analyzed, formatted and formulated into a proposal for sanction and an actionable plan for implementation. Even with the best of intentions and due diligence, humanly speaking, given the volume of information being processed, many errors can go unnoticed while preparing a proposal or action plan. The situation becomes even more challenging when a sanctioning authority or program management unit has to scrutinize, sanction and manage a large number of projects.

When one prepares a comprehensive project proposal for watershed development, in addition to soil and water conservation and land husbandry, one also has to make a survey and analysis of the demographic and the socio-economic situation of the target community. This is necessary in order to understand the institutional and social dynamics of the community, devise strategies that prioritize the poor, promote inclusiveness and participation, determine what areas and activities should be prioritized, finalize resource allocations and levels of contribution and, very importantly, track the impacts of interventions undertaken.

Moreover, when one begins physical implementation of a watershed project, a number of records have to be maintained at the field level such as a Muster Payments Register, a Measurements Book, Attendance Register, Materials and Equipments Register, etc. Sometimes, depending upon the nature of treatment, such as afforestation, the same parcel of land (survey number/Gat number) may have to be revisited more than once during the same work period in a given year as well as in the following year or two[22] and such activities will have to be recorded. In such cases, particularly, where expenditures are incurred on the same parcel of land several times, it is necessary to ensure transparency as well as to ensure that expenditures and works undertaken are as per sanctioned plans.

One would also have to maintain detailed and accurate records in order to ensure people get their dues, disputes are resolved, keep track of what is being done, ensure that sanctioned plans are followed, prevent false or inaccurate reporting, prevent malpractices and observe patterns and trends across various indicators.

For a Program Officers or a Program Management Unit tasked with ensuring that projects are implemented as per sanctioned plan and expectations as well as scrutinizing

22 Soil works like contours trenching or digging pits would be done normally in the months of April-May, followed by plantation works a month or so later, whenever the rains come. This gap is maintained in order to promote microbial activity and aeration of the soil. During the course of the year as well as during the rainy season in the following year, one would have to re-visit the plantation area to undertake soil working, cultural operations and replacements of dead plants. Thus, the period of attention that is given to such an intervention can extend to as much as 3 years.

requests for fund releases against work done and sanctioned plans, it is necessary to have a system that is comprehensive, robust and yet user friendly. Timely, comprehensive and detailed monitoring is necessary for successful project implementation.

To address all of the needs, challenges and requirements of implementing successfully watershed projects as well as efficiently and sensitively manage large scale programs, it is necessary to acquire, deploy and integrate technology-enabled documentation, reporting, management and control systems at all levels of project implementation and program management, from the field level upwards.

Systems Developed and Deployed by WOTR

Over the last 15 years, WOTR has played various roles, notable amongst them being project implementation, capacity building and program management[23]. It has faced the challenges mentioned above and developed very early on, systems and a suite of technology based products in order to address them. Some of the key software packages are as follows:

1. Net Planning Package (NPP)

This software removes the drudgery involved in PNP as well as rapidly and accurately scans, analyzes, formats and summarizes data and information into a project proposal that can be submitted for purposes of sanction and monitoring as well as used as an implementation plan at the project level.

Once survey/Gat number-wise data is fed into the system, the Net Planning software prepares a database of land capability classes as per the soil slope, depth, texture and erosion status as well as existing and proposed treatments together with costs involved. It offers online help to the user while entering data regarding the various technical terms used as well as various possible technical and land use options. However, in terms of proposed treatments, what is entered into the software is that which has been determined with the stakeholders in the field. More than one kind of treatment or change in land use can be entered for a single Gat/Survey number. According to the proposed land use (and treatments), a cost estimation is generated for implementation of the treatments. Cost estimation is done on the basis of a pre-determined unit cost schedule of treatments.

This software is used by the Indo-German Watershed Development Program (IGWDP) in Maharashtra and variants of it in the other states where the IGWDP is also being implemented; in NABARD funded projects under the Watershed Development Fund (WDF) and Rural Infrastructure Development Fund (RIDF) across the country. It has been widely adapted to suit local conditions and has been used in the Andhra Pradesh Rural Livelihoods Program (APRLP), the Drought Prone Area Program (DPAP) in Maharashtra, the Indo Swiss Participatory Watershed Development Program in Karnataka (ISPWDK) and several other watershed projects.

2. Project Appraisal and Verification Package (PAVP) – An Expert System

This "expert systems" package is used for project proposal scrutiny for purposes of sanction. It is particularly useful for those who have technical and financial responsibility for project or program management.

Once a Net Plan is entered into the system, the PAVP checks what is proposed to be done on the basis of land class and existing infrastructure; verifies the engineering and physical characteristics of the various mechanical and hydraulic measures[24]; the number and species of trees proposed to be planted as per location and land use and the estimated costs and owner/user contributions. The verification process is done according to best practice technical parameters, the schedule of costs approved for each land use or treatment and as per specific requirements of the program.

It automatically generates a query/checklist for variations or inconsistencies that exists in the proposal.

23 WOTR developed and managed the Capacity Building Phase of the large scale bilateral Indo-German Watershed Development Program in Maharashtra. As on January 2010, WOTR has also implemented/ is implementing watershed projects in 270 villages covering 167,000 hectares impacting 246,000 people in 4 states. In addition, WOTR has/ is supporting similar activities of other agencies covering 429,000 hectares impacting 576,000 people across 756 villages (Total coverage of 1026 watershed villages across 596,000 ha and impacting 822,000 people).

24 Area treatments (mechanical) such trenches, farm bunds, etc and drainage line treatments (hydraulic) such as check weirs, nullah bunds, etc.

This expert system is particularly useful at the program level where a large number of project proposals have to be scrutinized and sanctioned. It greatly reduces errors, drudgery and enables the preparation of projects that consistently meet high levels of technical proficiency and stakeholder participation. This software is extensively used by WOTR in the Capacity Building Phase of the IGWDP as well as in all watershed projects it is engaged with.

3. Socio-Economic Survey Package (SESP)

Socio-economic survey and analysis is a very important aspect of any developmental activity. WOTR has developed a useful and easy-to-use software for purposes of data collation, harmonization and analysis. This software helps to database all required demographic details, house-hold wise assets and land holding, agriculture and cropping pattern, livestock holdings, livelihoods, income and expenditure of families, extent of indebtedness, resources available, etc, analyze this data and format it in any desired manner.

The SESP is very useful in tracking the impacts of the developmental interventions undertaken at the household level (or individual level, as the case may be) and analyzing the changes that take place in each individual family (or person) as well as in the village as a whole, over a period of time.

This software is used by WOTR in the IGWDP as well as in all the projects it is engaged in; the Indo Swiss Participatory Watershed Development Program in Karnataka (ISPWDK) and has been widely distributed to partner NGOs.

4. Muster Sheet Preparation Package (MSPP)

At the field level, the Muster Sheet is the basic document of any work done and payments made in the watershed. Accounts are kept on the basis of Muster payments. Musters need to be summarized and analyzed for preparation of further reports. Preparation of these reports manually requires lots of time and effort –on average, 5-6 person days are required for preparing a muster sheet of 100 laborers who have worked for 2 weeks.

The Muster Sheet Preparation Package (MSPP) developed by WOTR is comprehensive and very user-friendly software. It can be programmed in the regional or local language. Using the data entered in the package, various registers can be printed such as (i) The Muster Sheet; (ii) The Muster Summary; (iii)The Labour Bill Book; (iv) The Measurement Book; (v) The Gat/Survey No. Work Done Register and (vi) The Land-use wise Works Register.

Once basic data has been entered, all the above-mentioned registers can be generated. At the click of a key, all required work related reports can be generated thus reducing monotonous and tedious tasks and freeing the staff for other more important work. This helps to reduce the clerical workload of the site personnel.

This software is extensively used by WOTR, its partners as well as the IGWDP, the DPAP – Maharashtra, the NGOs in the ISPWDK and has been widely distributed.

5. Decision Support System for Integrated Watershed Management (DSS)

The Decision Support System (DSS) is a basically a Manager's tool. It can be used at the program level where hundreds of projects have to be tracked and monitored simultaneously (a large scale system) or even at the project level (scaled down system).

The DSS enables a manager or a person responsible to measure and monitor progress in project implementation; track whether required processes have been complied with and verify whether the prescribed indicators, milestones and criteria are being met or fulfilled. This overview of project performance is necessary in order to facilitate performance improvements, make enabling changes,

ensure compliance and make decisions concerning funds releases.

When integrated with the financial management component of a project, namely, fund releases being made contingent on fulfilling a mandated minimum of requirements and conditions, the DSS greatly enhances transparency and accountability as it significantly reduces the discretionary powers of project authorities, especially those who have administrative and financial powers.

The DSS is used by WOTR in all its watershed projects as well as in the management of the Capacity Building Phase of the IGWDP. A large scale system was custom made for the bilaterally funded Andhra Pradesh Rural Livelihood Programme (APRLP).

5

PNP through the eyes of Stakeholders and Users

In 2005, a decade after the PNP methodology was introduced, WOTR conducted a study in 4 watershed villages where PNP had been undertaken, with the broad objective of documenting and analysing the perceptions and experiences of the key stakeholders, namely, the farmer couples, women, the landless, the Village Watershed Committees and facilitating NGOs[25].

The study showed that besides raising awareness of land and water conservation issues, PNP has, in all cases, improved social relationships[26], promoted the acquisition of skills and competencies and triggered processes that resulted in the formation of active and representative local institutions that are accountable to their communities[27]. It has also de facto contributed to a peaceful and sustained transformation of gender relationships, women's empowerment and their mainstreaming in the institutional life of their communities.

The following is how 3 key stakeholders, namely, the Farmer couples, the Village Watershed Committees (VWCs) and the NGOs experienced the impacts of the PNP process.

25 This Chapter is an adapted and abridged extract of some sections of a WOTR publication authored by Lalita Joshi and Ratna Huriem titled, "Participatory Net Planning: Reflections and Learnings from the Field" (2009).

The cumulative number of interviews conducted for all respondent categories was seventy-five.

26 This is the consequence of increased social interactions. Treatments, on a particular piece of land can only be effective and maintainable in relation to treatments undertaken on neighboring lands, for example, the issue of drainage of surplus water. This leads to dialogue and negotiations between neighbours.

27 This was the case at least at the time the survey was conducted.

Impacts and Experience of PNP: Stakeholders' Perspectives

The overall opinions of respondents from all the four villages as well as the NGOs were strongly favourable toward the PNP methodology. The NGOs in particular, looked at PNP not only as a tool for participatory planning but also as a tool necessary to change the attitudes of the people.

Some key observations are summarized below.

1. **Consensus Building and Ownership "Buy-In":** Involvement and participation of people from all socio-economic categories in planning, discussions, decision-making and implementation led to consensus being built up, conflicts resolved or mitigated and the fostering of a sense of ownership of the project.

   As one farmer remarked, "Individual experiences have an important role to play; then one feels it is one's own process".

2. **Increased Inter-Group and Intra-Community Trust:** The requirement of local contribution through shramdan[28] ensured that villagers worked in each other's fields. This diluted prejudices and helped build a consensus in regard to project measures and disciplines.

3. **Enhanced Awareness, Transparency, Knowledge and Capacity Building:** The level of awareness and transparency generated in the village resulted in the

28 Shramdaan means voluntary contribution of labour

willing participation of farmers and other stakeholders in the planning, decision-making and execution of the project. The trainings on watershed development and discussions helped build up their capacities, knowledge and skills as well as their self confidence. Villagers have become more knowledgeable of modern methods and techniques of farming (use of bio-fertilizers, crop selection, pest management, etc.) and soil and water conservation techniques.

4. **Enhanced Status of Women, Women Better Mainstreamed:** The villagers have understood that women's participation is as important as that of men's. Women became confident to freely express their views, opinions and suggestions, especially in VWC meetings and Gram Sabhas, and thus their participation increased[29]. Such participation enhanced the status of women. Women are now equipped with information, technical and financial skills, which makes them feel empowered[30]. In some villages, women played a lead role in enforcing a ban on liquor vending and drinking in the village thus reducing social evils.

5. **Comprehensive and Participatory Approach:** The VWCs and NGOs, in particular, found PNP a very effective method for determining appropriate treatments, the total financial costs as well as owner contribution suited to the specifics of every parcel of land in a participatory manner.

6. **Representative and Effective Local Institutional Arrangements:** The intensive discussions involved help to uncover resource use, claims, existing arrangements and power relationships which thus enables the formulation of an inclusive strategy and establishment of effective and representative local institutions for implementation and management of project created assets and common property resources.

7. **The "Time and Effort Factor":** It is sometimes critiqued that PNP requires a relatively large amount of time to be completed and requires a significant investment in time of the villagers as well as of the facilitating NGOs.

   However, respondents didn't object to the time taken as they were of the opinion that it actually ensures that work is done well and spending adequate time in planning increases the benefits later on. They were of the opinion that PNP cannot be carried out any faster considering the details that are required and the farmers also having to be satisfied with what is proposed and the likely outputs. A farmer remarked that "sustainability should be the key outcome of planning strategies" implying that it takes time to get people to understand what has to be done to get there.

   When asked how they would like to "re-design" the PNP methodology, the majority of the respondents strongly emphasised that they "will not change anything".

   The NGOs felt that the extent of detail sought in the PNP format as well as the time taken in collecting and processing it was necessary in order to plan well, motivate, inform the farmers and secure their "buy-in" and agreement. They felt that the effort and time spent in this exercise was well worth it.

Thus PNP as a method, in general, promoted transparency, a sense of ownership of the project and also prevented elite capture of the process. This ensured greater

29 Women were organized into Self Help Groups (SHGs) which helped build bonds of solidarity and emboldened them to put forward their interests and demands and actively participate in the institutional life of the village. The SHGs also provide opportunities for women to display their leadership qualities.

30 This is evident from the observed growing keenness of women to become literate so that they can more effectively participate in activities beneficial to them and their families.

inclusiveness, fairness and a wider and more equitable sharing in the benefits of the project[31].

31 While there were 2-3 persons who expressed some dissatisfaction, this was largely because technical non-feasibility or social constraints did not permit accommodating their wishes. It could also possibly, in part, indicate a degree of insensitivity or even a technical lapse on the part of some of the facilitators.

6

Formats for Participatory Net Planning

WOTR has developed a docket of 6 formats for collecting data during the Net Planning exercise, for subsequent analysis, sanction, presentation and implementation.

The most important one is Format 1 followed by Formats 4(A) and 4(B) which are used at the field level for collecting primary data. Format 1 focuses on Area Treatments and Formats 4(A) and 4(B) on Drainage Line Treatments. All the other formats are built upon these foundational formats, especially on Format 1.

This Chapter consists of 2 sections. Section 1 consists of the 6 unfilled formats together with detailed guidelines on how to fill up each data point, explanatory notes and supporting Technical Tables.

Section 2 consists of "Examples" wherein each of the six Formats has been filled in with data, by way of illustration.

An overview of the various Formats and their purpose is indicated below:

Format 1: The Net Plan Format (individual/stakeholder level)

The Net Plan format is designed to collect data about the specific Gat/Survey number, land use, ownership, and status of infrastructure, land capability, slope and other relevant details. It also records proposed land use and treatment plans as well as measurements of works to be undertaken.

Explanatory notes and detailed guidelines on how to fill up the Format together with supporting Technical Tables are included.

An overview of the data collected is given in Table 1 on next page:

Format 2: Net Plan Summary – Area Treatments

This Format is a Gat/Survey-number wise spread-sheet collating and summarising information collected using Format 1. It also contains information on costs of treatment, contribution component, phase in which proposed activity is to be undertaken and the net amount of funds required undertaking the proposed measures/treatments.

For illustrative purposes we assume that the project period extends over 4 years divided into 8 phases with each phase consisting of 6 months each. This can be changed, however, to suit specific project requirements.

Explanatory notes and detailed guidelines on how to fill up the Format together with supporting Technical Tables are included.

Format 3: Summary of Area Treatment and Costs

This Format is a Spread-sheet summarising Area Treatment costs (labour + material) on the basis of Proposed Land Use. It builds upon Format 2. Explanatory notes and detailed guidelines on how to fill up the Format are included.

Table 1: Information Gathered by Format 1

Data	Method of Collection
Name of owner/s	Land records/Interviews
Area of Gat/Survey numbers owned	Land records/Physical measurement
Area break-up as per Present Land Use viz., Cultivated, Pasture, Scrub, Waste, Fallow etc.	Site verification, Discussion with farmer couples/stakeholders on site
Crop information: kharif/rabi/summer; perennially/ seasonally irrigated/rainfed; Areas, Types of crops, yields of crops, fodder	Discussion with farmer couples on site
Land Capability Classification: - % Slope - Soil texture - Soil depth - Erosion status	Site verification Abney level Ball & ribbon/feel/Soil analysis Auger, pit method, Discussion with farmer couples/stakeholders Site verification.
Proposed Land Use.	Site verification Discussion with farmer couple/stakeholders
Treatments - Existing S & W Conservation measures - Repairs proposed - New S & W Conservation measures - Details regarding section, - Length, volume of earth-work etc. - Estimated number/species of trees, grasses.	Site verification, Demo-Layout using lime. Decision after discussion with concerned farmer couples/stakeholders Distances measured on field using measuring tape
Treatment to small and large Gullies/ Streams - Minor Drainage Line Treatments - Major Water Harvesting Structures	Site verification Dumpy level Discussion with farmer couple/stakeholders
Sketch of Gat/Survey - Land Capability Classification, Land Use - Existing and Proposed Layout of S & W Conservation measures	Approximate farm sketch (not to scale) Actual distances and lengths measured on field are entered into the formats and indicated on the farm sketch (not to scale)

Format 4(A) and 4(B): Drainage Line Treatments and Water Harvesting Structures

Format 4(A) captures data for planning and calculations of Minor Drainage Line Treatments (MDLTs).

Format 4(B) captures data for planning and cost calculations of Major Water Harvesting Structures (MWHSs). Data for both the Formats is collected through physical surveys as well as using of surveying instruments like the dumpy level.

Explanatory notes are included in the respective Formats.

Format 5: Physical and Financial Phasing of the Project

This Format consists of the summary of both Area and Drainage Line Treatments (land use wise in the case of the former) together with costs as well as the project phase when the measures are to be implemented.

It draws upon all the earlier formats [Formats 2, 3, 4(A) and 4(B)] and summarizes it in terms of what is to be done land use wise, when it is to be done and the costs involved. It is particularly useful for purposes of sanction.

Format 6: Gat/Survey-wise Phasing of Project

This format is particularly useful for implementation and monitoring of the project. It details Phase-wise and Gat/Survey number-wise Area Treatments (on a land-use basis) as well as Drainage Line Treatments to be undertaken across the project period/ cycle.

SECTION 1

Formats with Explanations and Guidelines (Blank)

Format 1

Net Plan Format at the Farmer/Stakeholder Level

1. Name of the Watershed: _____

2. Village: _____

3. Gat/Survey No.: _____

4. Names of Owners: _____

5. Area: _____ ha.

6. Land Use: (a) Irrigated: ____ ha (b) Rainfed: ____ ha. (c) Wasteland: ____ ha. (d) Forest: ____ ha.

7. Present Land Use

7/A. Cultivable Land (ha)

Season	Irri/Rainfed	Crop	Area (Ha)	Production	
				Grain (Q)	Fodder (Ton/Q)
1	2	3	4	5	6
Monsoon					
Winter					
Summer					

7/A/1. Based on the above, tick the appropriate land use:

C1R	☐	Single crop rainfed	C2R	☐	Double crop rainfed
C1I	☐	Single crop irrigated	C2I	☐	Double crop irrigated
C3I	☐	Triple crop irrigated	HC	☐	Horticulture
AH	☐	Agro Horticulture	HP	☐	Hortipasture
DH	☐	Dry Land Horticulture	----	☐	----------

7/B. Waste Lands (ha.)

Description: Open ____ Pasture _____ Thorny Bushes/Scrub _____ Rocky ____

7/B/1. Based on the above, tick the appropriate land use:

W1	☐	Waste land cultivable
W2	☐	Waste land uncultivable
W3	☐	Waste land uncultivable but culturable
PL	☐	Pasture Lands
GT	☐	Grassland with Trees
----	☐	----------

7/C. Forest Lands (ha.)
Tick as appropriate:

F1	☐	Thin forest
F2	☐	Thick Forest
FO	☐	Open forest
GT	☐	Grassland with Trees
P	☐	Pasture Land
----	☐	----------

7/D. Information Regarding Land Capability Classification

Sr.No.	Land Character	Irrigated Area	Rainfed Area	Waste Land	Forest Land
1	**2**	**3**	**4**	**5**	**6**
1	Area (ha)				
2	Slope (%)				
3	Soil Depth (cm)				
4	Soil Texture				
5	Erosion Status				
6	Land Class				

Note: Please refer to Table 1 (The Code Sheet) for appropriate symbols to be used in each category. Additional categories and symbols may be used as per local needs and requirements.

8. Proposed Land Use and Treatment (inclusive of existing treatments)

Note: Please refer to Table 1 (The Code Sheet) for appropriate symbols and suggestions regarding land use as well as treatments. Additional categories and symbols may be used as per local needs and requirements.)

8/A. Waste Lands/Forest Lands: (Land Use)

(Tick as appropriate)

AF	☐	Afforestation
AGF	☐	Agro Forestry
HP	☐	Horti-Pasture
PD	☐	Pasture Development
RF	☐	Reforestation
GT	☐	Grassland with Trees
CC	☐	Crop Cultivation
FF	☐	Forestry
DH	☐	Dry Land Horticulture
------	☐	----------

8/A/1: Treatments

Sr. No.	Treatment	Area (ha)/No.	Measurements				No. of Spillways	No of Plants	Plant Species
			Length (m)	Existing C/Section (sq.m)	Proposed C/Section (sq.m)	Total/ Addl. Earth work (cum)			
1	2	3	4	5	6	7	8	9	10
1.									
2.									
3.									

Note: Depending upon the nature of treatments proposed, the columns can be modified.

8/B. Cultivable Land
(Tick as appropriate)

C1R	☐	Single crop rainfed
C2R	☐	Double crop rainfed
C1I	☐	Single crop irrigated
C2I	☐	Double crop irrigated
C3I	☐	Triple crop irrigated
HC	☐	Horticulture
AH	☐	Agro Horticulture
AGF	☐	Agro Forestry
DH	☐	Dry Land Horticulture
----	☐	----------

8/B/1: Treatments

Sr. No.	Type of Bund/ Treatment	Area (ha)	Bund/ Treatment Number	Measurements of bunds/Treatments				No. of Spill-ways	No. of Plants	Species
				Length (m)	Existing C/Section (sq.m)	Proposed C/Section (sq.m)	Total/ Addl. Earthwork (cum)			
1	2	3	4	5	6	7	8	9	10	11

8/C. On Field Drainage Treatments

Sr. No.	Treatments (Existing + Proposed)	Number*	Length (m)	Width (m)	Average Height (m)	Total/Addl. Stone works (cum)
1	2	3	4	5	6	7

Note: * This is to be used where small standard structures are involved (such as loose boulder structures, gully plugs, etc.) and measurements are not required to be taken.

9. Map of Gat (Survey) Number

[Should be hand drawn here to reflect the existing and proposed land use and treatment situation.]

10. Signature of Farmer Couple (Users)

Signature of Technical Expert

Signature of Site Supervisor

Signature of Community Organizer

Guidelines for Filling Up Format 1

1. **Points 3+4+5:** The area and owners' names of the survey number mentioned in the format is taken from land records (7-12 and/or 8A extracts in Maharshtra) obtained from the revenue department/Talathi at village level.

2. **Point 6:** Area-wise break-up of the survey number/Gat no. as per Present Land Use such as Cultivated (irrigated/rainfed), Waste Land and Forest land is done based on field assessment, discussion and measurement.

Present Land Use

3. **Point 7/A:** Information like cultivated area, irrigation facility, crop type, crop yield, fodder produced etc. is collected for all major kharif, rabbi and summer crops being grown in that survey number.

4. **Point 7/A/1:** Based on the information collected in point 7/A above, the appropriate land use is classified accordingly.

5. **Point 7/B:** Waste land is further classified and identified as Open, Pasture, Thorny Bushes/ Scrub and Rocky.

6. **Point 7/B/1:** Based on the information collected in point 7/B above, the appropriate land use is classified accordingly.

7. **Point 7C:** The forest land status is indicated as thin, thick, open forest, etc., depending on the tree canopy of the area. Classify the land use by ticking the appropriate box.

8. **Point 7/D: Land Capability Classification (LCC)** is a systematic classification of different kinds of land according to those properties, which determine the ability of the land to produce common cultivated crops and pasture plants virtually on a permanent basis. This classification is made primarily for agricultural purposes and it enables the farmer to use the land according to its capability and to treat it according to its need.

   The land is divided into eight capability classes, which are numbered in Roman numerals from I to VIII. These eight classes are grouped in two land use suitability groups viz. (1) "Land Suited for Cultivation and Other Uses" (Classes I to IV) and (2) "Land Not Suited for Cultivation but Suitable for Other Uses" (Classes V to VIII). The land capability classes are based on the degree of erosion hazard and the intensity of limitations for use. Class I land is the best and the most easily farmed land and has no hazard or limitation for use, while in class VIII land, nothing of economic value can be produced and it may need protection and management to conserve.

While determining the LCC through net planning process, only four parameters viz. Slope, Soil Depth, Soil Texture and Erosion hazard are considered. The LCC parameters for irrigated, rainfed, waste and forest land are investigated and indicated separately. For example an elongated Gat (Survey) extending from the foot hills on to flat agricultural land may constitute two different land classes. This can be demarcated on the map and details given separately.

9. **Point 7/D/2: Slope –** The slope of land in steep areas can be found with the abney level. The slope is read in degrees and converted to percent (Please refer Table 2). While using the abney level, the observer sights through the eye-piece an object at his eye height and so manipulates the level that the image of the spirit level bubble is centered on the fixed cross wire at his own height on the object (mostly a tree or bush). He then reads the angle of the slope in degrees. Before use, care should be taken to check the alignment of the level by bringing the reading to zero. When placed on a level surface the bubble should be at the center of the spirit level. The land slope also can be measured by using a clinometer, hydromarker or dumpy level and measuring tape.

Slope is classified as follows:

Code	*% Slope*
A	0 – 1
B	1 – 3
C	3 – 5
D	5 – 10
E	10 – 15
F	15 – 25
G	more than 25

10. **Point 7/D/3: Soil Depth –** The soil depth is measured by using a Soil Auger. It can also be measured by taking a sample pit of adequate depth in the area to determine the soil profile and depth. The outcome is discussed with the owner and indicated in the table.

Soil Depth is classified as follows:

Code	*Soil depth (in cm.)*
d1	less than 7.5
d2	7.5 – 22.5
d3	22.5 – 45
d4	45 – 90
d5	more than 90

11. **Point 7/D/4: Soil Texture –** Since field methods are used for determining soil texture during PNP, only major textures like loam, clay (black soils), sandy soils, murum and a few combinations may be identified. In the Ball and Ribbon method, the soil texture is determined by feeling moist soil between the fingers and evaluated as described in the Soil Texture Rating System described in Table 3. The average texture is entered in the net plan format.

With practice it is possible to distinguish the various soil textural classes fairly accurately in the field. Feel of fingers is the most important criterion, which will easily help a field worker to distinguish fine, moderately fine, medium, moderately coarse and very coarse soils.

12. **Point 7/D/5: Erosion Hazard –** Erosion of soil due to water is determined by visual observation. The following thumb-rules may be used to identify the erosion status:

Sheet erosion (e1): Except for very well levelled and well protected fields, all lands are susceptible to erosion. Hence, even in comparatively level lands (having slopes ranging from 1-3 %) where no sign of soil loss is apparent, it may be assumed that sheet erosion is occurring.

Rill erosion (e2): Mildly undulating lands mainly under cultivation having slopes ranging between 3% to 10% are susceptible to rill erosion. On close observation, finger like water ways or rills can be observed within the soil layer itself which channelize the runoff from the field.

Small gullies (e3): Neglected fields and grass lands on lower slopes of hills show evidence of rill erosion developing into gully erosion i.e. the soil layer in the water channel is washed away exposing the murum or weathered section beneath.

Gullied lands (e4): If small gullies are left untreated, the weathered section is also washed away leaving the hard bed-rock exposed. Steep upper slopes showing exposed bed-rock and highly eroded foot hills are examples of e4 erosion.

Erosion Hazard is classified as follows:

Code	*Type of erosion*
e1	Sheet erosion
e2	Rill erosion
e3	Small gullied erosion
e4	Severe gullied erosion

13. **Point 7/D/6: Land Capability Classification (LCC)/ Land Coding**
Land coding is used to work out the land class. The land code is a composite of four characteristics viz. slope, soil depth and texture, erosion status. It is written as follows:

$$\text{Land Code} = \frac{\text{Texture-Depth}}{\text{Slope-Erosion}} \quad \text{OR} \quad \text{as: [Texture – Depth/ Slope – Erosion]}$$

Land class for each of these characteristic is then determined from the LCC rating table. (Please refer to **Table 4.**)

An Example: Suppose a piece of land has the following properties/characteristics:

i. Texture: Loam (l)
ii. Soil Depth: > 90 cm (d5)
iii. Slope: 1-3% (B)
iv. Erosion Hazard Rill erosion (e2)

The land code for this parcel of land is written in one of two ways as follows:

$$\frac{\text{I} - \text{d5}}{\text{B} - \text{e2}} \quad \text{OR} \quad \text{as I} - \text{d5} / \text{B} - \text{e2}$$

Now using the LCC Rating Table, we note the land capability class of each property/ characteristic as follows:

Property/Characteristic	*Land Class*
I = loam	I
d5 = soil depth > 90 cm.	I
B = slope, 1-3%	II
e2 = rill erosion	III

Now, by convention, the overall land capability class of a piece of land will be the highest Class given to any of the assessed properties. In this case, this piece of land will be classified as Class III, since erosion is the major factor limiting land use.

Proposed Land Treatment according to Land Use

14. **Point 8/A: Waste Land –** The planning team and the owners of the land discuss the use to which the waste land in that particular survey number will be put to. They agree to the proposed land use and indicate accordingly (√) in the box provided. Some considerations are included in Table 5.

15. **Point 8/A/1:** Based on the proposed land use and field situation, the land treatments and area covered/number of units are inidcated (col. 2+3). The length and cross section of each physical treatment (existing and proposed) is discussed, decided on site and mentioned in the Columns 4, 5 and 6; the total/additional earth work to be done as well as spillways to be constructed are indicated in Columns 7 and 8). The number of plants proposed to be planted along with the species are mentioned in the last two columns (9+10).

16. **Point 8/B: Cultivable Land –** As above, the proposed land use is discussed with the farmer/ stakeholder and the same indicated (√) accordingly.

17. **Point 8/B/1:** The treatment proposed is entered in the column 2, e.g. Farm Bund (FB). The area proposed to be covered under this treatment is mentioned in Col. 3. Each bund is mentioned separately in the table. In case of existing bund, existing average cross section is measured on site and mentioned in Col. 6. If required, the cross section of the existing bund is discussed among the owners and planning team and the new proposed cross section is indicated in column 7. In case of a completely new bund, Col. 6 will have no entry made (=0). The amount of earthwork involved (new or additional) is indicated in Col. 8.

    Each bund is provided with a suitable number of spillways to drain out excess runoff from the farm. The number of spillways depends on the catchment area of the bund and length of the bund. The number is accordingly estimated on site after discussions with the owner/stakeholder and indicated in Col. 9.

In case plantation on bunds needs to be done, then, the number and types of plants on each bund are mentioned in the last two columns (col. 9 and 10).

18. **Point 8/C: On Field Drainage Treatments –** If there are small or large gullies passing through the survey number, the possibility of arresting them from further eroding the soil is discussed in the planning process. The treatments to control the gullies are decided and accordingly, the type and number are indicated in Col. 2 and 3. The length, width and height are measured for each treatment and indicated in Col. 4, 5 and 6 respectively. These details are average measurements for each treatments. Total or additional stone work required is indicated in Col. 7.

19. **Point 9: Map of Gat/Survey Number –** The map of the survey number showing existing as well as proposed land use and treatments is drawn by hand on the format. The map is not to scale but gives a clear picture of the information filled up in the format.

    Land capability class may be indicated by using the relevant color codes. Each class has been assigned a standard colour as follows:

Sr. No.	*Land Capability Class*	*Colour Code*
1	I	Green
2	II	Yellow
3	III	Red
4	IV	Blue
5	V	Dark Green or Uncolored
6	VI	Orange
7	VII	Brown
8	VIII	Purple

20. **Point 10:** At the end of the exercise, the owners/stakeholders and the planning team members sign the completed format as a token of agreement to execute the plan.

Table 1: Code Sheet

List of Abbreviations/Acronyms

Abbr.	*Description*
Avg	Average
Cm	Centimeter
Cum	Cubicmeter
Cumec	Cubic Meter per Second
C/S	Cross section
Ha	Hectare
Irri	Irrigated
M	Meter
Q	Quintal
Qty	Quantity
Rs.	Indian Rupees
sq.m	Square Meter
SWC	Soil and Water Conservation
T	Tonne
%	Percentage

Soil Texture

Code	*Soil texture*
C	Clay
S	Sandy
L	Loam
Si	Silty
Sil	Silty loam
Cl	Clay loam
Sl	Sandy loam
Ls	Loamy sand
Sc	Sandy clay
Sic	Silty clay
Scl	Sandy clay loam
Sicl	Silty clay loam

Slope

Code	*% slope*
A	0 – 1
B	1 – 3
C	3 – 5
D	5 – 10
E	10 – 15
F	15 – 25
G	more than 25

Soil Depth

Code	*Soil depth (in cm.)*
d1	less than 7.5
d2	7.5 - 22.5
d3	22.5 - 45
d4	45 - 90
d5	more than 90

Erodibility

Code	*Type of erosion*
e1	Sheet erosion
e2	Rill erosion
e3	Small gullied erosion
e4	Severe gullied erosion

Present/Proposed Land Use

Code	*Land use*
C1R	Single crop rainfed
C2R	Double crop rainfed
C1I	Single crop irrigated
C2I	Double crop irrigated
C3I	Triple crop irrigated
W1	Waste land cultivable
W2	Waste land uncultivable
F0	Open forest
F1	Thin forest
F2	Thick forest
PL	Pasture land
CC	Crop Cultivation
AH	Agro Horticulture
HC	Horticulture
HP	Hortipasture
GT	Grass land with trees
FF	Forestry
AGF	Agro Forestry
PD	Pasture Development
DH	Dry Land Horticulture

Proposed Treatment

Code	*Treatment*
RFB	Repair of farm bunds
CB	Contour bunding
FB	Farm bunding
CST	Contour staggered trenching
CCT	Continuous contour trenching
GP	Gully plug
EP	Earthen plug
SO	Stone Outlet
PO	Pipe Outlet
GB	Gabion structure
LB	Loose boulder
PIT	Pits
RF	Reforestation
AF	Afforestation
WAT	Water absorption trench

Table 2: Percent Slope Corresponding To Degree Of Slope

Angle in deg.	% Slope	Angle in deg.	% Slope	Angle in deg.	% Slope
0.5	0.87	15.5	27.73	30.5	58.90
1.0	1.75	16.0	28.67	31.0	60.09
1.5	2.62	16.5	29.62	31.5	61.28
2.0	3.49	17.0	30.57	32.0	62.49
2.5	4.37	17.5	31.53	32.5	63.71
3.0	5.24	18.0	32.49	33.0	64.94
3.5	6.12	18.5	33.46	33.5	66.19
4.0	6.99	19.0	34.43	34.0	67.45
4.5	7.87	19.5	35.41	34.5	68.73
5.0	8.75	20.0	36.40	35.0	70.02
5.5	9.63	20.5	37.39	35.5	71.33
6.0	10.51	21.0	38.39	36.0	72.65
6.5	11.39	21.5	39.39	36.5	74.00
7.0	12.28	22.0	40.40	37.0	75.36
7.5	13.17	22.5	41.42	37.5	76.73
8.0	14.05	23.0	42.45	38.0	78.13
8.5	14.95	23.5	43.48	38.5	79.54
9.0	15.84	24.0	44.52	39.0	80.98
9.5	16.73	24.5	45.57	39.5	82.43
10.0	17.63	25.0	46.63	40.0	83.91
10.5	18.53	25.5	47.70	40.5	85.41
11.0	19.44	26.0	48.77	41.0	86.93
11.5	20.35	26.5	49.86	41.5	88.47
12.0	31.26	27.0	50.95	42.0	90.04
12.5	22.17	27.5	52.06	42.5	91.63
13.0	23.09	28.0	53.17	43.0	93.25
13.5	24.01	28.5	54.30	43.5	94.90
14.0	24.93	29.0	55.43	44.0	96.57
14.5	25.86	29.5	56.58	44.5	98.27
15.0	26.79	30.0	57.74	45.0	100.00

Source: Technical Manual on Watershed Development for NWDPRA Scheme, Prepared by Central Soil and Water Conservation Research & Training Institute, Dehradun, Page no. 343

Table 3: Soil Texture Rating in Field

Feel of fingers	Ball formation	Stickiness	Ribbon formation	Texture	Textural classes with symbol
Very smooth	Forms hard ball	Definitely stains fingers	2.5 to 5.0 cm long ribbon formation	Fine	Clay (c), Silty clay (sic)
Smooth	Forms moderately hard ball when dry	Definitely stains fingers	Ribbons out but breaks easily	Moderately fine	Silty clay loam (sicl), Clay loam (cl), Sandy clay (sc)
Powdery-flour like	Forms firm ball	Definitely stains fingers	–	Medium	Loam (l), Silty loam (sil), Sandy clay loam (scl), Silt (si)
Moderately gritty	Forms easily broken ball	Definitely stains fingers	–	Moderately coarse	Sandy loam (sl),
Moderately gritty	Will shape but not form ball	Stains fingers slightly	–	Coarse	Loamy sand (ls)
Very gritty	–	–	–	Very coarse	Sand (s)

Source: *Using and Interpreting Soil Information for Land Capability – by K.G. Tejwani*

Table 4: Land Capability Class Rating Table

Land Class	Soil Texture	Soil depth (cm) & symbol	% slope of land and symbol					Erosion class & symbol		Permeability (mm/hr)	Conductivity (mm hos/cm at 25°C)	Climate
			Alluvial soils	Black soils	Red soils	Deep red soils of eastern ghats, western ghats and Nilgiris	Himalayas	Effect of Past Erosion	Susceptibility to erosion e.g. distance from active gully heads			
I	sicl, cl, l, sl, sil, scl	> 90 (d_5)	0-1 (A)	0-1 (A)	0-1 (A)	0-1 (A)	0-1 (A)	Up to 1/4 of top soil lost; sheet erosion (e_1)	Very far away	Moderate (20-50)	0-2	Humid climate with well distributed rainfall throughout the year.
II	sicl, cl, sl, sil, scl	45-90 (d_4)	1-3 (B)	1-3 (B)	1-3 (B) 3-5 (C)	1-3 (B) 3-5 (C)	1-3 (B)	Up to 1/4 of top soil lost; sheet erosion (e_1)	Minimum 60 m	Mod. Slow (5-20) Mod. rapid (50-125)	2-4	Humid climate with occasional dry spells; sub-humid crop yield frequently reduced by drought.
III	sc, sic, c, ls	22.5-45 (d_3)	3-5 (C) 5-10 (C)	3-5 (C)	5-10 (D) 10-15 (E)	5-10 (D)	3-5 (C) 5-10 (D)	Up to 1/4 to 3/4 top soil lost; rill erosion (e_2)	Between 6-60 m for 0-3% slope	Slow (1.25-5) Rapid (125-250)	4-8	Sub-humid, crop yield frequently reduced by drought; semi-arid
IV	c, s	7.5-22 (d_2)	10-15 (E)	5-10 (D)	10-15 (E) 15-25 (F)	15-25 (F) 25-33 (F)	10-15 (E) 15-25 (F)	¾ top soil and up to ¼ sub-soil lost; small gullies (e_3)	–	Very slow (>1.25) Very rapid (>250)	8-16	Semi-arid and arid

Land Class	Soil Texture	Soil depth (cm) & symbol	% slope of land and symbol					Erosion class & symbol		Permeability (mm/hr)	Conductivity (mm hos/cm at 25°C)	Climate
			Alluvial soils	Black soils	Red soils	Deep red soils of eastern ghats, western ghats and Nilgiris	Himalayas	Effect of Past Erosion	Susceptibility to erosion e.g. distance from active gully heads			
V	Same characteristics as Class I land except for one or more limitation of wetness or stoniness or rockiness or adverse climatic conditions. It has no hazard of land erosion like class I land.							Gullied land (6 m (e_4) or sand dunes	Marginal wide strip near gully head)	–	> 16	–
VI		7.5 or less (d_1)	15-25 (F)	10-15 (E)	25-33 (G)	33-50 (H)	25-33 (G) 33-50 (H)	Gullied land (e_4) or sand dunes	Gully sides and beds	–	–	–
VII		7.5 or less (d_1)	25-33 (G)	15-25 (F)	33-50 (H)	50-100 (I)	50-100 (I)	Bad lands	Gully sides and beds	–	–	–
VIII		Rock	> 33	> 25	> 50	> 100	> 100 (J)			-	-	-

Source: *Fundamentals of Watershed Management Technology by Dr. G.D. Singh and T.C. Poonia Page No. 210-211 published by Yash Publishing House, Bikaner, Rajasthan, India*

Table 5: Some Considerations on Land Use and Soil Conservation Practices for the Eight Capability Classes

Land Capability Class	Subclass (domain kind of land)	Suitable for (only the most intensive safe use is mentioned)	Special need for precaution
A. LAND SUITABLE FOR CULTIVATION			
I. Very good cultivable land	Deep, nearly level productive valley land.	Intensive cultivation of all climatically adapted crops.	No special difficulty in farming. Usual good farming practice to maintain soil fertility and conserve water.
II. Good cultivable land	IIe – Good soil on gentle slopes, subject to water erosion or wind erosion or sandy soils.	Cultivation with precaution.	Protection from erosion. Use conservation irrigation methods.
	IIw – Good soil, slightly wet or subject to overflow.	Cultivation with management of excess water and selection of crops adapted to wet conditions.	Drainage improvement or flood protection.
	IIs – Soil with minor soil problems such as clay or sandy texture, moderate depth, or slight alkali.	Cultivation with selected crops adapted to soil limitations.	Treatments to offset soil limitation and to conserve irrigation water.
III. Moderately good cultivable land.	IIIe – Good soil on moderate slopes subject to water erosion on sandy soil, subject to wind erosion.	Cultivation with precautions against permanent land damage.	Special attention to erosion control and conservation irrigation.
	IIIw – Soil with moderately wet or subject to overflow.	Cultivation with careful management of excess water and selection of crops adapted to wet conditions.	Intensive drainage improvement or protection from flooding.
	IIIs – Soil with moderate problems due to moderate depth, gravels or alkali.	Cultivation with careful selection of crops adapted to soil limitations.	Intensive treatment to offset or overcome soil limitations and conserve irrigation water.

Land Capability Class	Subclass (domain kind of land)	Suitable for (only the most intensive safe use is mentioned)	Special need for precaution
IV. Fairly good land, suited for occasional or limited cultivation	IVe – Moderately steep land subject to serious water erosion, sandy soils subject to wind erosion.	Occasional cultivation in rotation with hay or pasture or orchards, protected by permanent cover crops.	Intensive erosion control when in cultivation.
	IVw – Bottom land that is very wet or subject to severe overflow.	Cultivation of special summer crops, hazards of crop failure are always present.	Intensive drainage, special attention to seeding and harvest dates to minimise crop failure on overflow land.
	IVs – Fairly good land with limitations due to shallowness, gravel, stone or strong alkali.	Occasional cultivation in rotation with hay or pasture.	Very intensive treatment to overcome soil limitations. Careful selection of crops.
	IVc – Good soil with just enough rainfall for crops in favourable years.	Cultivation during wet years, frequent crop failure. Better in permanent vegetation.	Conserve all rainfall, develop water for irrigation or convert to pasture or grazing use.
B. LAND NOT SUITABLE FOR CULTIVATION			
V. Very well suited to grazing. Not arable.	Vw – Good productive mountain meadows that are wet and have short growing season.	Grazing and production of wild hay.	Proper season of use and rate of stocking; protect from gullying.
VI. Well suited for grazing or forestry. Not arable.	VIe – Steep land subject to erosion if cover is depleted.	Grazing or forestry or both.	Manage grazing and logging to maintain sufficient residue and litter on the soil for soil and moisture conservation. Fire protection.
	VIw – Flat land. Occasionally with saline salts. Permanently wet or subject to overflow.	Grazing.	Manage grazing to prevent soil puddling and to favour desirable forage plants.
	VIs – Flat to gently sloping shallow stony, gravely or alkali land.	Grazing or forestry or both.	Good range and forestry management practices. Fire protection.
	VIc – Good or fairly good soil, not enough moisture for cultivation.	Grazing primarily, some forestry. Could be cultivated if water were available.	Good range and forestry management practices. Fire protection.

Land Capability Class	Subclass (domain kind of land)	Suitable for (only the most intensive safe use is mentioned)	Special need for precaution
VII. Fairly well suited for grazing or forestry. Not arable.	VII – Very steep land subject to erosion if cover is depleted.	Grazing or forestry.	Carefully manage grazing and logging to maintain enough plant litter for soil and moisture conservation. Fire protection.
	VIIw – Flat, permanently wet or overflow land along streams, tidal marsh areas.	Limited grazing.	Range grazing to favour desirable plants.
	VIIs – Very shallow, stony or strong alkali land.	Grazing or forestry or both.	Good range and forestry management practices. Fire protection.
	VIIc – Fairly good soil, not enough moisture for cultivation.	Grazing or forestry or both.	Good range and forestry management practices. Fire protection.
VIII. Suited only for wildlife, recreation and protection for water supplies.	VIIIe – Highly erodible gullies, bad lands and sand dunes.	Watershed and wildlife.	Maintain maximum cover for erosion.
	VIIIw – Tidal land, stream channel and swamps.	Wildlife, recreation and water spreading.	Improve for wildlife and recreation.
	VIIIs – Barren mountain tops, little or no soil mantle.	Recreation and watershed.	Improve for wildlife and recreation.

Source: *Adapted from "Watershed Management, Guidelines for Indian Conditions" by E.M. Tideman, Published by Omega Scientific Publisher, New Delhi. Page no. 45, 46 and 47.*

Format 2

Gat/Survey Numberwise Net Planning at Watershed/ Project Level (Soil Conservation Measures)

The data collected using Format 1 is meant to be used for preparing the Project Proposal for sanction as also to facilitate implementation of planned measures. This data is presented in a summarized form in the following format, covering the entire watershed to be treated.

Note: This Format makes provision for calculating beneficiary contribution against either total costs incurred or labour costs. In the unlikely event that a project does not have the requirement of beneficiary contribution, then some of these columns (26, 27, 28) can be deleted.

Name of Watershed:

Sr. No.	Gat No./ Survey No.	Area (ha.)	Slope	Depth	Texture	Erodibility	Land Class	Present Land Use	Proposed Land Use	Existing Treatment				Proposed Treatment					Cost/ cum or Cost/ unit (2)	Cost of SWC works (Rs)	Plants (No)	Cost/ plant (3)	Cost of plants (Rs.)	Total Costs	Labour Costs (4)	Expected contribution (5)	Grant (Rs.) (6)	Phase (7)	Remarks
										Treatment	Length (rm)/ Units (Nos.)	Cross Section	Volume (cum)/ Units (Nos.)	Treatment	Length (rm)/ Units (Nos.)	Cross Section	Volume (cum)/ Units (Nos.)	Net volume (cum)/ Units (Nos.)										
													(12x13)				(16x17)	(1)	Rs.	(19x20)		Rs.	(22x23)	(21+24)		Rs.	Rs.	(25-27)	No.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30

Notes:

(1) Net volume (cum)/Units (Nos.) = 18 for new items and (18-14) for existing items.

(2) These costs also include material and other costs such as the costs of stones, supervision, etc. However, it is generally observed that the bulk of costs involved in soil and water conservation works (also known as area treatments) is on labor. Where material is used, these are largely available locally and at no cost. The cost of on-site layout markings as well as supervision of works should also be factored in. Unit Cost Schedules should be prepared in order to facilitate costing across the various treatment measures.

(3) These costs also include labour, cost of planting material and other related costs like aftercare, fertilizers, for the entire period needed for of plant establishment. Unit Cost Schedules should be prepared in order to facilitate costing across the various plant species.

(4) This column on "Labour costs" is introduced here to accommodate the fact that most projects insist on a contribution from beneficiaries usually by way of labor contribution ("shramadan"). If this is not a requirement, this column can be deleted. This figure is obtained from the Unit Cost Schedule of the SWC works and the Unit Cost Schedule of Plants.

(5) We assume that the project expects a contribution from the beneficiaries. This could be in the form of labour, cash or kind. It is usually in the form of a percentage of total costs incurred or of labor costs. Accordingly, this component can be computed against either column 25 or column 26, as the case may be. If such a provision is not required, this column may be deleted.

(6) This column (28) is provided in order to calculate the amount of external financial support that would be required net of beneficiary contribution (Col. 27). If no contribution is expected, then the Grant component required will equal the Total Cost of the project (= Col. 25) and this Col. (28) may be deleted. In this case, Col. 25 will suffice for purposes of costing.

(7) This is to facilitate planning of what gets done during which period of the project cycle. If a project runs for 4 years and work periods are planned on a half yearly basis, then there will be 8 Phases in all. Works to be undertaken are apportioned Phase-wise accordingly.

Guidelines for Filling Up Format 2

1. **Col. 1: Serial Number** – The respective serial number is to be filled up.

2. **Col. 2: Gat (Survey) Number** – This is obtained from Format 1/No. 3.

   Sub-divided Gat/Survey numbers are listed separately and sequentially, e.g. Gat No. 1/1; Gat No. 1/2, etc. In the event of different land uses within the same undivided Gat No./ Survey No., these can be indicated separately and sequentially as follows: Gat No. 1/a; Gat No. 1/b, etc.

   Each entry in this column is given a separate serial number and corresponding entries in all other columns made accordingly.

3. **Col. 3: Area** – This is obtained from Format 1/No. 5 or No. 6 or No. 7/D/1.

4. **Col. 4: Slope** – This is obtained from Format 1/No. 7/D/2.

5. **Col. 5: Depth of Soil** – This is obtained from Format 1/No. 7/D/3.

6. **Col. 6: Soil Texture** – This is obtained from Format 1/No. 7/D/4.

7. **Col. 7: Erosion Status** – This is obtained from Format 1/No. 7/D/5

8. **Col. 8: Land Capability Class** – This is obtained from Format 1/No. 7/D/6.

9. **Col. 9: Present Land Use** – This is obtained from Format 1/No. 7/A/1 and/or 7/B/1 and/or 7/C, as the case may be.

10. **Col. 10: Proposed Land Use** – This is obtained from Format 1/No. 8/A or 8/B, as the case may be.

    Existing Treatment: Cols. 11, 12, 13 and 14

11. **Col. 11, 12, 13 and 14: Type/Length/Cross Section/Volume/Units** – Data for these columns are obtained from Format 1/No. 8/A/1 and/or 8/B/1 and/or 8C. The volume (col 14) of existing works is obtained by multiplying cols 12 and 13. In case small structures such as spill ways, gully plugs, etc., exist (and do not require repairs that involve incurring costs), these can be entered as number of units. In case repairs to these involve costs, then volume may be calculated, if required.

    Proposed Treatment: Cols. 15, 16, 17 and 18

12. **Col. 15, 16, 17 and 18: Type/Length/Cross Section/Volume/Units** – Data for these columns are obtained from Format 1/No. 8/A/1 and/or 8/B/1 and/or 8C. The volume (col 18) of proposed works is obtained by multiplying cols 16 and 17.

    In case small structures such as spill ways, gully plugs, etc., are proposed which do not require design specifications (volumetric computations), these can be entered as number of units; otherwise volume may be calculated.

13. **Col. 19: Additional Volume/Units** – This column deals with the net quantity of work to be carried out either by way of new proposed structures or repairs to existing treatments. The net volume/units of work involved in new proposed treatments is obtained from Col. 18. In the case of existing structures, the net volume/units of work to be done is calculated by subtracting the existing volume/units of work (col. 14) from the proposed volume/units in col. 18, viz., (18-14).

14. **Col. 20: Cost/cum or Cost/unit** – These costs are obtained from the Unit Costs Schedule of the various activities. In case of small outlets, gully plugs etc., where Unit Cost Schedules are not necessary, the estimated cost per unit is entered.

15. **Col. 21: Cost of SWC works** – The total cost (Rs.) for a particular treatment type is calculated by multiplying the cost per cum or cost/unit (column 20) by the net volume/units (column 19).

16. **Col. 22: Plants** – This is obtained from Format 1/No. 8/A/1 and/or 8/B/1.

17. **Col. 23: Cost Per Plant** – This is obtained from the Unit Cost Schedule for plantation of the various plant species. An example of one such Schedule is given in Table 6. Such costs schedules may differ depending upon plant species as well as intended land use, e.g., establishing an orchard or planting fruit trees will be more expensive than planting fodder/ fodder species on bunds or raising a wood lot.

18. **Col. 24: Cost of Plants** – This is obtained by multiplying col. 22 and col. 23 (22 x 23).

19. **Col. 25: Total Cost** – This is obtained by adding col 21 and col 24 (21 + 24).

20. **Col. 26: Total Labour Cost** – The reason for this column is indicated in Note # 3 above. It may be deleted, if not required.

21. **Col. 27: Expected Contribution** – The reason for this column is indicated in Note # 4 above. It may be deleted, if not required.

22. **Col. 28: Grant** – The reason for this column is indicated in Note # 5 above. Where beneficiary contribution is required, this figure is arrived at by subtracting col 27 from col. 25 (25-27). Where no contribution is required, then this figure is equal the figure in col. 25.

23. **Col. 29: Phase** – This column depends upon the project period, the work cycle, the location from where the project is to be initiated as well as the nature of the activity to be undertaken. If the project period is of 48 months and the work cycle is a 6-months period, then there will be 8 phases. Then, depending upon when, where and what is proposed to be done, the phase best suited to that activity is accordingly entered here.

24. **Col. 30: Remarks** – This column is of great importance as it is descriptive and one can provide additional information or justification for a proposed uncommon activity, eg.if the present land use is C1I, the source of water for irrigation may be mentioned. In case of public lands, the name of the concerned Government Department is to be mentioned. Other features or limitations with respect to soil, fertility, plants species etc. can also be mentioned here.

    If beneficiary contribution for a particular activity (e.g. enrichment of a common property resource is sought, the reasons thereof may be recorded here.

Table 6: Examples

Unit Cost Schedule for Plantation Purposes

The **cost per plant** needs to be worked out taking into consideration the average costs for digging and filling pits, fertilizers, manure, labour, plant/ seed cost, after care of plants (mulching, weeding, watering, pest management, etc), etc. along with replanting (may be up to 30%).

Accordingly different Plantation Schedules which give the per plant plantation cost (labour + material) for different types of land use such as Afforestation, Horti-Pasture etc are prepared. The cost per plant is taken from these schedules.

Below are 2 examples of such Unit Cost Schedules. Kindly note that the costs will change depending upon the wage rate assumed as well as the prevailing market/purchase rates of material, supplies and services.

A. Plantation Schedule for Grassland with Trees (with refilling of trench)

Proposed Land Use: AF/RF/GT Depth: d1, d2

Proposed Treatment: CCT/CST/WAT/SB/GP Erodibility: e4

Slope Group: > 15%

Sr. No.	Items	Labour Rs.	Material Rs.	Total Rs.
1.	Digging the tree pit of 0.3 x 0.3 x 0.3m size with spacing of 1m.	0.75	-	0.75
2.	Cost of planting material with transportation	-	2.10	2.10
3.	Planting and refilling of pits (assuming 42 plants/day @ 10 min. per plant)	0.72	-	0.72
4.	Cost of fertiliser, manure & pesticide (BHC)	-	1.00	1.00
5.	2 Weeding and mulching (assuming 60 plants/day)	1.00	-	1.00
6.	Replanting (@ 30% of 2, 3 & 4)	0.26	0.93	1.19
	Sub-Total	2.73	4.03	6.76
*	Lime for layout, grass seed, agave plantation		0.56	0.56
	Total (Cost Per Plant)			7.32

* Cost for marking, sowing of grass seeds etc. are clubbed and computed as per plant costs.

B. Plantation Schedule for Dryland Horticulture/Hortipasture

Proposed Land Use: DH/HP

Depth: d2

Proposed Treatment: CB/FB/RFB, CCT/CST/SB

Erodibility: e3, e4

Slope Group: 0–10% / 10–15%

Sr. No.	Items	Labour Rs.	Material Rs.	Total Rs.
1.	Digging the tree pits of size 0.5x0.5x0.5 approx @ Rs. 12/cum.	1.50	-	1.50
2.	Cost of plant including transportation (hardy species like Ber, Aonla, Sitaphal etc.)	-	3.50	3.50
3.	Planting and refilling (@ 20 plants/manday)	1.50	-	1.50
4.	Cost of fertiliser, manure and pesticides	-	1.00	1.00
5.	Weeding and mulching (@ 40 plants/manday)	0.75	-	0.75
6.	Replanting (30% of 2, 3 & 4)	0.45	1.35	1.80
	Sub-Total	4.20	5.85	10.05
*	Lime for layout, grass seed bed, agave plantation,		5.25	5.25
	Total			15.30

* Grass beds to be made in the inter Bund/inter CCT space. Plant population assumed is 400 per ha.

Format 3

Summary of Area Treatment and Costs

This format is used for the purpose of computing overall costs on the basis of proposed land use and treatments to be undertaken.

Sr. No.	Proposed Land Use	Land Class	Area (ha.)	Treat-ment	Length (RM)/ Units (No.)	Total Volume (cum)/ Units (Nos)	Treatment Cost (Rs.)	No. of Plants	Cost of Plants (Rs.)	Total Costs (Rs.)	Labour Costs (Rs.)	Material + Allied Costs (Rs.) (11-12) (*1)	Expected Contribution (Rs.)	Grant (Rs.)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1	Afforestation														
	Sub Total														
2	Agro-Horticulture														
	Sub Total														
3	Crop Cultivation														
	Sub Total														
4	Etc.														
	Sub Total														
	Grand Total														

Note: (*1) – This column has been introduced in order to get an idea of the costs of material/allied expenses involved in undertaking the proposed treatments under the respective proposed land uses. This information is sometimes required by project authorities/donors, etc.

Guidelines for Filling Up Format 3

1. **Col. 1: Serial Number** – The respective serial number is entered. Each change in proposed Land Use is given a separate serial number.

2. **Col. 2: Proposed Land Use (PLU)** – This is the aggregation of data obtained from Format 2/Column 10.

3. **Col. 3: Land Class (LCC)** – This is the aggregation of data obtained from Format 2/Column 8.

4. **Col. 4: Area (ha)** – This is the sum total of the area under the respective proposed land use. It is obtained from Format 2/Column 3.

5. **Col. 5: Treatment** – Proposed treatments for each proposed land use/land class are to be listed in this column. For example, for AF/VII, treatments proposed may be CCT, SB, GP, etc. This is the aggregation of data obtained from Format 2/Column 15.

6. **Col. 6: Length (running meters – RM) or Units (numbers)** – This is the aggregation of the sum totals of similar treatments under the respective proposed land uses. It is obtained from Format 2/Column 16.

7. **Col. 7: Total Volume (cum)/Units (Nos.)** – This is the aggregation of the sum totals of similar treatments under the respective proposed land uses. It is obtained from Format 2/Column 19.

8. **Col. 8: Treatment Cost** – This is the sum total of all SWC costs under the respective proposed land uses. It is obtained from Format 2/Column 21.

9. **Col. 9: Number of Plants** – This is the sum total of all proposed plants under the respective proposed land uses. It is obtained from Format 2/Column 22.

10. **Col. 10: Cost of Plants** – This is the sum total of the cost of plants under the respective proposed land uses. It is obtained from Format 2/Column 24.

11. **Col. 11: Total Costs** – This is the sum total of all costs under the respective proposed land uses and can be obtained from Format 2/Column 25. It is also obtainable by adding Col. 8 and Col. 10 (8+10) of Format 3.

12. **Col. 12: Labour Costs** – This is the sum total of labour costs under the respective proposed land uses and can be obtained from Format 2/Column 26.

13. **Col. 13: Material+Allied Costs** – It can be obtained by subtracting Col. 12 from Col. 11 (11-12) under the respective proposed land uses.

14. **Col. 14: Expected Contributions** – This is the sum total of beneficiary contributions under the respective proposed land uses and can be obtained from Format 2/Column 27.

15. **Col. 15: Grant** – This is the sum total of net funds required to undertake the proposed works under the respective proposed land uses and can be obtained from Format 2/Column 28.

16. **Col. 16: Remarks** – This consists of pertinent and relevant remarks, if any, and may also be referenced from Format 2/Column 30.

Format 4(A) + (B)

Drainage Line Treatments and Water Harvesting Structures

In watershed development, in situ soil and moisture conservation treatments (also known as "area treatments") should always be prioritized because it results in optimal run-off management and maximum water harvesting on surface, in the soil strata and ground water aquifers. The benefits that accrue from such an approach are far greater and spread over a longer period of time than from those that result from an approach that focuses exclusively or largely on drainage line treatments only. Nevertheless, a comprehensive and integrated approach also necessarily includes the establishment of soil and water conservation as well as water harvesting structures on the drainage channels in the watershed.

Drainage line treatments are broadly of 2 kinds – (i) Minor Drainage Line Treatments [MDLTs] – loose boulder structures, gully plugs, earthen plugs, small gabion structures, small nullah bunds, etc. – which largely act as soil conservation structures and (ii) Major Water Harvesting Structures [MWHSs] – big gabion structures, large earthen nullah bunds, check dams, weirs, percolation tanks, etc. – which act largely as water impounding structures.

The following two formats only deal with structures which are erected on drainage lines or channels. Minor structures (MDLTs) are included in Format 4A and Major structures (MWHSs) in Format 4B. Minor structures that are done on private lands or common lands are included in Formats 1, 2 and 3 respectively.

Format 4A: Minor Drainage Line Treatments

Sr. No.	Type of Structure	Nearest Gat/ Survey No./ Chainage	Unit Nos. *1	Measurements (M)			Total Stone Work (cu.m)	Cost				Phase
				Length	Width	Height		Cost/ Cum or Cost/ unit or Cost/ RM *2	Mat-erial Cost *3	Lab-our Cost *3	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13
1												
2												
3												
4												

*1 This is used where small standard structures are involved such as GPs and measurements are not required
*2 As required.
*3 If required by project design. These columns may be deleted otherwise.

Format 4B: Major Treatments – Water Harvesting Structures

For major structures such as these below, detailed engineering designs together with costings should also be provided/ attached separately.

Sr. No.	Structure Type and Identification number	Location to Nearest Gat/ Survey number/ Chainage	Catchment area in ha by land use (A) and Runoff coefficient (C)								Length of Catchment m	Elevation Difference m	Time of Concentration (TC) [Hr]	Rainfall Intensity for TC (mm/hr)	Peak Run-off Rate (cum/sec)	Design Dimensions of Structure (m)				Cost			Storage Capacity [cum/Ha-m]	Phase
			Cultivation		Pasture		Forest		Total							Length	Height	Top	Bottom width	Material *1	Labour *1	Total (21+22)		
			A1	C1	A2	C2	A3	C3	A	C												Rs.	Cost	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1.																								
2.																								
3.																								
4.																								

Note: *1 If required by project design. May be dispensed with otherwise

Format 5

Physical and Financial Phasing of the Project

This Format brings together all the earlier formats (Formats 2, 3, 4 A and 4 B)and summarizes it in terms of what is to be done land use wise, when it is to be done and the costs involved. It is particularly useful for purposes of sanction.

We assume that there are 8 phases in the project. It can be changed according to project design.

Sr. No	Land Use	Treatment	Unit of Measure	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5		Phase 6		Phase 7		Phase 8		Total	
				Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
A) Area Treatment																					
Total A																					
[B] Drainage Line Treatment																					
Total B																					
Grand Total (A + B)																					

Format 6

Gat/Survey Numberwise Phasing

Note: Gat/Survey numbers should be specifically mentioned in the "Phase" columns.

This format is particularly useful for implementation of the project. It gives a land parcel-wise overview of what is proposed to be done and is useful for the field implementer as well as for monitoring purposes.

Area Treatments

Sr. No.	Land Use	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
1									
2									
3									

Drainage Treatments

Sr. No.	Type	No.	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
1										
2										
3										

SECTION 2

Illustrative Examples

This Section consists of "filled in" versions of each of the above 6 Formats, by way of illustration. These formats are discrete in nature and subsequent ones do not necessarily build or draw upon the preceding ones. Explanations, where required, are also provided in the respective formats.

Format 1

Net Plan Format at the Farmer/Stakeholder Level

1. Name of the Watershed: Darewadi-Shelkewadi

2. Village: Darewadi

3. Gat/Survey No.: 80

4. Names of Owners: Bhikaji + Sunanda Khandoba

5. Area: 3.45 ha.

6. Land Use:
(a) Irrigated: 0.45 ha
(b) Rainfed: 2.00 ha.
(c) Wasteland: 1ha.
(d) Forest: Nil

7. Present Land Use

7/A. Cultivable Land (ha)

Season	Irri/Rainfed	Crop	Area (Ha)	Production	
				Grain (Q)	Fodder (Ton)
1	2	3	4	5	6
Monsoon	Irrigated Rainfed	Tomato Bajra	0.45 2.00	80.00 40.00	 2.1
Winter	Irrigated	Wheat	0.45	11.00	5.00
Summer	Irrigated	Fodder Maize	0.20		15.00

7/A/1. Based on the above, tick the appropriate Present Land Use:

C1R	√	Single crop rainfed
C2R	☐	Double crop rainfed
C1I	☐	Single crop irrigated
C2I	☐	Double crop irrigated
C3I	√	Triple crop irrigated
HC	☐	Horticulture
AH	☐	Agro Horticulture
HP	☐	Hortipasture
DH	☐	Dry Land Horticulture
----	☐	----------

7/B. Waste Lands (ha.): 1ha

Description: Open √ Pasture _____ Thorny Bushes/Scrub _____ Rocky ____

7/B/1. Based on the above, tick the appropriate land use:

W1	☐	Waste land – cultivable
W2	√	Waste land – uncultivable but culturable
W3	☐	Waste land – unculturable
PL	☐	Pasture Lands
GT	☐	Grassland with Trees
----	☐	----------

7/C. Forest Lands (ha.): Nil

Tick as appropriate:

F1	☐	Thin forest
F2	☐	Thick Forest
FO	☐	Open forest
GT	☐	Grassland with Trees
PL	☐	Pasture Land
----	☐	----------

7/D. Information Regarding Land Capability Classification

Sr. No.	Land Character	Irrigated Area	Rainfed Area	Waste Land	Forest Land
1	2	3	4	5	6
1	Area (ha)	0.45	2.00	1.00	nil
2	Slope (%)	0-1 (A)	3-5 (C)	12 (E)	nil
3	Soil Depth (cm)	87 cm (d5)	27 cm (d3)	7 cm (d1)	nil
4	Soil Texture	Sl	Sl	gls	nil
5	Erosion Status	e1	e2	e3	nil
6	Land Class	II	III	VI	nil

Note: Please refer to the Code Sheet for appropriate symbols to be used in each category. Additional categories and symbols may be used as per local needs and requirements.

8. Proposed Land Use and Treatment (Inclusive of Existing Treatments)

8/A. Waste Lands/Forest Lands: (Land Use)

(Tick as appropriate)

AF	☐	Afforestation
AGF	☐	Agro Forestry
HP	☐	Horti-Pasture
PD	☐	Pasture Development
RF	☐	Reforestation
GT	√	Grassland with Trees
CC	☐	Crop Cultivation
FF	☐	Forestry
DH	☐	Dry Land Horticulture
------	☐	----------

8/A/1: Waste Lands Treatments:

Sr. No.	Treatment	Area (ha)/ No.	Measurements				No. of Spillways	No. of Plants	Plant Species
			Length (m)	Existing C/ Section (sq.m)	Pro-posed C/ Section (sq.m)	Total/ Addl. Earth work (cum)			
1	2	3	4	5	6	7	8	9	10
1.	Continuous Contour Trench	1.00 ha.	900 m	0	0.18	162	Nil	400	Subabul, Neem, Eucalyptus, Shivan, etc.
2.	Stone/ Earthen Plugs	3 Nos	6	0	0.6	10.8	Nil		
3.	Grass Beds	8 Nos	10	0	0.15	12	Nil		

Note: Depending upon the nature of treatments proposed, the columns can be modified.

8/B. Cultivable Land:

(Tick as appropriate)

C1R	☐	Single crop rainfed
C2R	√	Double crop rainfed
C1I	☐	Single crop irrigated
C2I	☐	Double crop irrigated
C3I	√	Triple crop irrigated
HC	☐	Horticulture
AH	☐	Agro Horticulture
AGF	☐	Agro Forestry
DH	☐	Dry Land Horticulture
----	☐	----------

8/B/1: Treatments

Sr. No.	Type of Bund/ Treatment	Area (ha)	Bund/ Treatment Number	Measurements of bunds/Treatments				No. of Spillways	No. of Plants	Species
				Length (m)	Existing C/ Section (sq.m)	Pro-posed C/ Section (sq.m)	Total/ Addl. Earth work (cum)			
1	2	3	4	5	6	7	8	9	10	11
1	CB	2.00	1	180	-	0.60	108.00	1	-	-
			2	260		0.60	156.00	1	-	-
			3	110		0.60	66.00	1	-	-
2	FB	0.45	1	50	0.15	0.60	22.50	1	-	-
			2	40	0.15	0.60	18.00		-	-

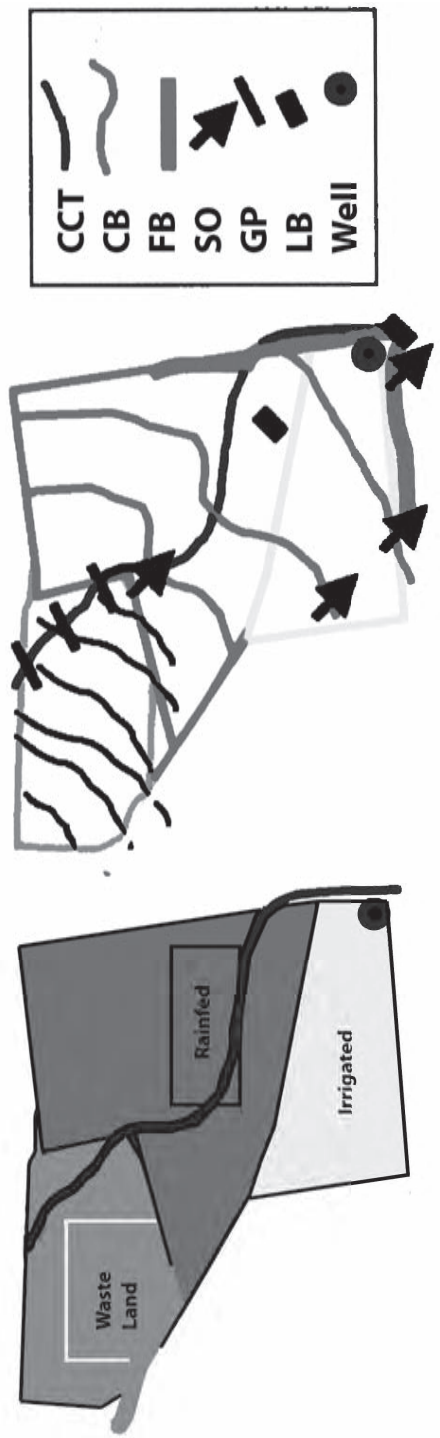
8/C. On Field Drainage Treatments

Sr. No.	Treatments (Existing + Proposed)	Number*	Length (m)	Width (m)	Average Height (m)	Total/Addl. Stone works (cum)
1	2	3	4	5	6	7
1	LB Structure	2	10	1.45	1	29

Note: * This is to be used where small standard structures are involved (such as loose boulder structures, gully plugs,etc) and measurements are not required to be taken.

9. Map of Gat (Survey) Number*

[Should be hand drawn here to reflect the existing and proposed land use and treatment situation]



* Please refer 'Artplate 1' for colour coding.

10. Signature of Farmer Couple (Users)

Signature of Technical Expert

Signature of Site Supervisor

Signature of Community Organizer

Format 2

Gat/Survey Numberwise Net Planning at Watershed/ Project Level (Soil Conservation Measures)

The data collected using Format 1 is presented in a summarized form in the following format, covering the entire watershed to be treated.

Name of Watershade

Sr. No.	Gat No./ Survey No.	Area (ha)	Slope	Depth	Text-ure	Erodi-bility	Land Class	Pre-sent Land Use	Pro-posed Land Use	Existing Treatment				Proposed Treatment					Cost/ cum or Cost/ unit (2)	Cost or SWC works (Rs.)	Pla-nts (No.)	Cost/ Plant (3)	Cost of Pla-nts (Rs.)	Total Costs	Lab-our Cost (4)	Exp-ected Cont-ribu-tion (5) [20% of Col. 26]	Gra-nts (Rs.) (6)	Pha-se (7)	Rem-arks
										Tre-atm-ent	Len-gth (rm)/ Units (Nos.)	Cross Sec-tion	Vol-ume (cum)/ Units (Nos.)	Tre-atm-ent	Len-gth (rm)/ Units (Nos.)	Cross Sec-tion	Vol-ume (cum)/ Units (Nos.)	Net Vol-ume (cum)/ Units (Nos.) (1)											
													(12x 13)				(16x 17)		Rs.	(19x 20)		Rs.	(22x 23)	(21+ 24)	Rs.	Rs.	(25-27)	No.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	1/1	2.79	B	d3	scl	e1	III	C1R	CC	-	-	-	-	SO	4	-	4.00	4.00	200.	800	-			800	800	160	640	4	
										FB	152.	0.10	15.2	RFB	152	0.70	106.40	91.20	45	4,104	-			4104	4104	820.8	3283.2	4	
										-	-	-	-	FB	170	0.70	119.00	119.00	45	5,355	-			5355	5355	1071	4284	4	
2	2/1	0.3	B	d2	scl	e2	IV	C1R	CC	-	-	-	-	FB	150	0.70	105.00	105.00	45	4,725	-			4725	4725	945	3780	4	
										-	-	-	-	SO	3	-	3.00	3.00	200	600	-			600	600	120	480	4	
3	2/2	4.16	C	d3	scl	e1	III	C1R	CC	-	-	-	-	FB	707	0.70	494.90	494.90	45	22,271	-			22271	22271	4454.2	17816.8	2	
										FB	601	0.10	60.10	RFB	601	0.70	420.70	360.60	45	16,227	-			16227	16227	3245.4	12981.6	2	
										-	-	-	-	SO	23	-	23	23	200	4,600	-			4600	4600	920	3680	2	
4	2/3	0.60	D	d2	sc	e3	IV	W1	AF	-	-	-	-	CCT	600	0.18	108	108	58	6,264	-			6264	6264	1252.8	5011.2	2	
										-	-	-	-		48	1	48	48	66.70	3,202	-			3202	3202	640.4	2561.6	2	
										-	-	-	-	RCT	300	1	300	300	7.40	2,220	300	7	2,130	4350	3330	666	3684	2	
5	3/1	1.50	C	d3	scl	e2	III	C2R	AH	-	-	-	-	PIT	150	-	150	150	-	-	150	50	7,500	7500	0	0	7500	4	
6	4	1.00	D	d2	sc	e3	IV	W1	AF	-	-	-	-	CCT	168	0.18	30.24	30.24	58.00	1,754	-	0	0	1754	1754	350.8	1403.2	1	
										-	-	-	-	WAT	158	1	158	158	66.70	10,539	-	0	0	10539	10539	2107.8	8431.2	1	
										-	-	-	-	RCT	168	1	168.	168	7.40	1,243	168	7	1,192.6	2435.6	1864.6	372.92	2062.68	1	
7	5	4.50	B	d3	scl	e1	III	C2R	CC	-	-	-	-	FB	821	0.70	574.70	574.70	45	25,862	-	0	0	25862	25862	5172.4	20689.6	2	
										-	-	-	-	SO	23	-	23	23	200	4,600	-	0	0	4600	4600	920	3680	2	
										FB	945.00	0.10	94.50	RFB	945	0.70	661.50	567	45	25,515	-	0	0	25515	25515	5103	20412	2	
8	6/1	1.28	E	d1	gcl	e3	VI	W1	AF	-	-	-	-	CCT	246	0.18	44.28	44.28	58	2,568	-	0	0	2568	2568	513.6	2054.4	2	
										-	-	-	-	WAT	184	1	184.00	184.00	66.70	12,273	-	0	0	12273	12273	2454.6	9818.4	2	
											-	-	-	RCT	246	1	246.00	246.00	7.40	1,820	246	7	1,746.20	3566.2	2730.2	546.04	3020.16	2	
9	7/1	3.2	B	d4	sicl	e1	II	C1I	CC	-	-	-	-	FB	927	0.70	648.90	648.90	45.00	29,201	-	0	0	29201	29201	5840.2	23360.8	2	
										FB	536	0.10	53.60	RFB	536	0.70	375.20	321.60	45	14,472	-	0	0	14472	14472	2894.4	11577.6	2	
										-	-	-	-	SO	30	-	30	30.00	200	6,000	-	0	0	6000	6000	1200	4800	2	
Total		19.33																		206,213	864	0	0	206213	206213	41242.6	164970		

Notes:

(1) Net volume (cum)/Units (Nos.) = 18 for new items and (18-14) for existing items.

(2) These costs also include material and other costs such as the costs of stones, supervision, etc. Unit Cost Schedules facilitate costing across the various treatment measures.

(3) These costs also include labour, cost of planting material, etc. Unit Cost Schedules facilitate costing across the various plant species.

(4) The labour costs are obtained from the Unit Cost Schedules of the SWC and Plantation works respectively.

(5) A beneficiary contribution of 20% of labour costs is assumed here.

(6) This is the amount of external financial support that would be required net of beneficiary contribution to complete the project.

(7) This indicates what works are to be done during the project cycle.

Format 3

Summary of Area Treatment and Costs

This format is used for the purpose of computing overall costs on the basis of proposed land use and treatments to be undertaken.

Sr. No.	Proposed Land Use	Land Class	Area (ha.)	Treat-ment	Length (RM)/ Units (No.)	Total Volume (cum)/ Units (Nos.)	Treatment Cost (Rs.)	No. of Plants	Cost of Plants (Rs.)	Total Costs (Rs.)	Labour Costs (Rs.)	Material + Allied Costs (Rs.) (11-12) (*1)	Expected Contribution (Rs.)	Grant (Rs.)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
1	Afforestation	IV VI	23.85 101.2	CCT RCT WAT	35,915 17,958 3,500	6,465 17,958 3,500	3,74,953 1,32,889 2,33,450	0 17,958 0	0 127,502 0	3,74,953 2,60,391 2,33,450	3,74,953 1,99,334 2,33,450	0 61,057 0	74,991 39,867 46,690	2,99,962 2,20,524 1,86,760	
	Sub Total		125.05		57,373	27,923	7,41,292	17,958	127,502	8,68,794	8,07,736	61,058	1,61,547	7,07,246	
2	Agro-Horticulture	III	10	PIT	1,000	1,000	-	1,000	50,000	50,000	0	50,000	0	50,000	
	Sub Total		10	-	1,000	1,000	-	1,000	50,000	50,000	0	50,000	0	50,000	
3	Crop Cultivation	IV	290.5	FB RFB SO	29,537 3,150 1,330	20,676 1,890 1,330	9,30,416 85,050 2,66,000	0 0 0	0 0 0	9,30,416 85,050 2,66,000	9,30,416 85,050 2,66,000	0 0 0	1,86,083 17,010 53,200	7,44,333 68,040 2,12,800	
	Sub Total		290.5		34,017	23,896	12,81,466	0	0	12,81,466	12,81,466	0	2,56,293	10,25,173	
4	Etc.														
	Sub Total														
	Grand Total		425.55		91,390	51,819	20,22,758		177501.8	22,00,260	20,89,202	1,11,058	4,17,840	17,82,419	

Note: (*1) - This column enables us to get an idea of the costs of material/allied expenses involved in undertaking the proposed treatments.

Format 4(A)

Minor Drainage Line Treatments

Sr. No.	Type of Structure	Nearest Gat/ Survey No./ Chainage	Unit Nos. *1	Measurements (M)			Total Stone Work (cu.m)	Cost				Phase
				Length	Width	Height		Cost/ Cum or Cost/ unit or Cost/ RM*2	Mate-rial Cost *3	Lab-our Cost *3	Total	
1	2	3	4	5	6	7	8	9	10	11	12	13
1	Loose Boulder	100,101	1	10	2.10	0.80	17.10	175.40	40	2960	3000	5
2	Gabion	150,149	1	24	2.45	1	128.40	334.55	23004	19953	42956	6
	Total		2				145.5		23044	22,913	45,956	

*1 Small standard structures not requiring taking of measurements.
*2 As required.
*3 Where required by project design. These columns may be deleted otherwise.

Format 4(B)

Major Treatments – Water Harvesting Structures

For major structures such as these below, detailed engineering designs together with costings should also be provided/ attached separately

Sr. No.	Structure Type and Identification number	Location to Nearest Gat/ Survey number/ Chainage	Catchment area in ha by land use (A) and Runoff coefficient (C)								Length of Catchment m	Elevation Difference m	Time of Concentration (TC) [Hr]	Rainfall Intensity for TC (mm/hr)	Peak Runoff Rate (cum/sec)	Design Dimensions of Structure (m)					Cost			Storage Capacity (cum/Ha-m) Cost	Phase
			Cultivation		Pasture		Forest		Total							Length		Height	Top width	Bottom width	Material *1	Labour *1	Total Cost (21+22) Rs.		
			A1	C1	A2	C2	A3	C3	A	C															
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
1.	CD-1	139	110	0.6	10	0.36	60	0.5	171	0.55	1900	109.48	19.55	100.05	26.18	20	5.25	1	2.5	141,851	60,793	202644		0.35	8
2.																									
	Total																								

Note: *1 If required by project design.

Format 5

Physical and Financial Phasing of the Project

This Format summarizes what is to be done land use wise, when it is to be done and the costs involved.

Sr. No	Land Use	Treatment	Unit of Measure	Phase 1		Phase 2		Phase 3		Phase 4		Phase 5		Phase 6		Phase 7		Phase 8		Total	
				Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)	Units	Cost (Rs.)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
A) Area Treatments																					
1	**AF**	EGP	ha.	1.48	0	118.80	56250	125.02	27000	62.44	0	172.78	29250							480.52	112500
2		GP			240		5950		9450		2100		5950								23690
3		GSD			296		23760		25004		12488		34556								96104
4		HCCT			2381.50		229968		240112		131800		317837								922099
5		RCT			1363		161441		70124		57630		288106								578665
6		CCT			1586.25		203184		88250		72522		362610								728153
Sub-Total				1.48	5866.75	118.80	680553	125.02	459940	62.44	276541	172.78	1038309	0	0	0	0	0	0	480.52	2461210
1	**AH**	WW	ha.	0		10.72	0	10.00	0	19.00	5783	14.31	1157							54.03	6940
2		FB							0		6610										6610
3		GSD					1072		1000		1900		1431								5403
4		PIT					60562		56600		107540		80938								305640
5		RFB					3036						2182								5217
6		SO					300		0		1350		300								1950
Sub-Total				0	0	10.72	64970	10.00	57600	19.00	123183	14.31	86007	0	0	0	0	0	0	54.03	331760
Total A				1.48	5866.75	129.52	745523	135.02	517540	81.44	399724	187.09	1124316	0	0	0	0	0	0	534.55	2792970
B) Drainage Line Treatments																					
1	**CD-1**	CW	ha.	0		12.75	0	11.00	0	21.00	5793	15.91	1187							57.00	6940
2		LB							0		6710										6640
3		GB					1070		1020		2000		1461								5443
4		EGP					60560		56700		107640		80998								305640
5		Repairs					3032						2192								5257
Total B				0	0	12.75	64962	11.00	57720	21.00	125283	15.91	86101	0	0	0	0	0	0	57.00	331960
Grand Total				1.48	5866.75	142.27	810485	146.02	575260	102.44	525007	203.00	1210417	0	0	0	0	0	0	591.55	3124930

Format 6

Gat/Survey Number Wise Phasing

Note: Gat/Survey numbers are mentioned in the "Phase" columns.

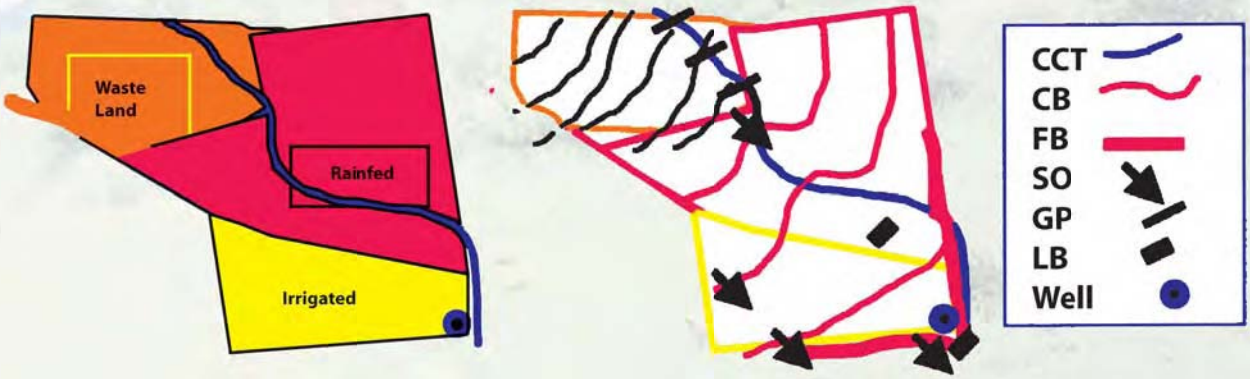
This format gives a land parcel-wise overview of what is proposed to be done land use wise.

Sr.No.	Land Use	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
Area Treatments									
1	AH	11/3,12/3, 13/3,14/3, 15/3,17/2, 19/3,2/3, 22/3,24/2, 55/2,56/4	27/3,28/3, 30/3,31/3, 32/3,33/3, 34/3,35/3, 36/3,37/3, 51/3	52/3	143/3,57/3, 67/3	61/3	68/3,69/3, 72/3		
2	CC	1/1,11/1, 12/1,128/1, 129/1,13/1, 130/1,14/1, 15/1,16/1, 17/1,18/1, 19/1,2/1, 21/1,22/1, 23/1,24/1, 55/1,56/1	25/1,26/1, 27/1,28/1, 29/1,30/1, 21/1,32/1, 33/1,34/1, 35/1,36/1, 37/1,49/1, 50/1,51/1	38/1,39/1, 40/1,41/1, 42/1,43/1, 44/1,45/1, 46/1,47/1, 48/1,52/1, 53/1,54/1	142/1,143/1, 144/1,57/1, 58/1,65/1, 66/1,67/1	59/1,60/1, 61/1,63/1, 64/1	68/1,69/1, 70/1,71/1, 72/1		
3	DH	1/3,12/4, 15/4,16/2, 19/4,2/4, 21/3,24/3, 56/3	27/4,31/4, 37/4	39/3,40/3, 42/3,45/3	142/3,57/4, 58/3,66/3	59/3,61/4, 64/3	70/3,71/3		
4	GF	1/2,11/2, 12/2,129/2, 13/2,14/2, 15/2,18/2, 19/2,2/2, 56/2	29/2,34/2, 35/2,49/2, 50/2,51/2	47/2,48/2, 52/2,53/2, 54/2	66/2	59/2,60/2, 63/2	68/2,71/2		

Drainage Line Treatments (Minor and Major)

Sr.No.	Type	No.	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7	Phase 8
1	Lb	5	120/121; 140/141	10/11; 25/26	94/95					
2	Gabion	3			70/71	84/85	110/111			
3	Cd	2						118	36	

Area Map (for colour coding)



Watershed Views

Doing PNP

On Site Planning Gat/Survey No. Wise

Measuring Existing and Proposed Treatments

Slope Identification and Layout Marking

Securing Consensus

Doing PNP

Explaining the Area to be treated

Showing the Place to be treated

PNP Training

PNP Training

Area and Drainage Line Treatments

Water Absorption Trench (WAT)

Continuous Contour Trench (CCT)

CCT Based Plantation

Area and Drainage Line Treatments

Compartment Bunds

Plantations

Stone Bund

Gully Plugs

Gabion Dam

Check Dam

Nallah Bund

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