कार्यालय प्रधान मुख्य वन संरक्षक (कक्ष भू–प्रबंध), सतपुड़ा भवन, मध्यप्रदेश, भोपाल

क्रमांक / एफ–3 / 97 / 2018 / 10–11 / 12 / 1353 भोपाल, दिनांक 08–04–2021

प्रति,

श्री बिजेन्द्र स्वरूप,
वन महानिरीक्षक (एफ.सी.)
भारत सरकार, पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय,
इंदिरा पर्यावरण भवन, अलीगंज,
जोरबाग रोड़, नई दिल्ली–110003

विषयः–जिला सागर के अंतर्गत बंडा वृहद सिंचाई परियोजना के निर्माण हेतु 505.5 हेक्टेयर वनभूमि जल संसाधन विभाग को उपयोग पर देने बाबत्।

संदर्भः– भारत सरकार, पर्यावरण वन एवं जलवायु परिवर्तन मंत्रालय, इंदिरा पर्यावरण भवन, अलीगंज, जोरबाग रोड़, नई दिल्ली का पत्र क्र. 8-04/2020-FC दि. 05.3.2021

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विषयांतर्गत प्रकरण में भारत सरकार के उक्त संदर्भित पत्र से 06 बिन्दुओं की चाही गई जानकारी निम्नानुसार प्रेषित है :–

बिन्दु क्र0	विवरण	पालन
A	It should be ascertained that the plan addressing the shifting of transmission line requires additional forest land or not.	इस बिन्दु के संबंध में आवेदक संस्थान ने अवगत कराया है कि इन विद्युत लाईनों को शिफ्ट करने पर कुल 233.05 हेक्टेयर वनभूमि की अतिरिक्त रूप से आवश्यकता होगी। इस वनभूमि के प्रत्यावर्तन का प्रस्ताव पृथक से प्रस्तुत किया जायेगा।
B	Revised shape files of proposed forest diversion shows presence of settlements & agricultural fields which may require rehabilitation and resettlement of people having rights as pre FRA, 2006. State Government may submit their comments on this important issue.	प्रस्ताव में पूर्व में आवेदक संस्था ने 505.50 हेक्टेयर वनक्षेत्र के लिये आवेदन किया था। तत्पश्चात इसे पुनरीक्षित कर 530.85 हेक्टेयर किया गया है। इस प्रकार पुनरीक्षित प्रस्ताव में 25.35 हेक्टेयर वनक्षेत्र बाद में सम्मिलित किया गया है। इस 25.35 हेक्टेयर वनक्षेत्र पर अतिक्रमण है। वनमण्डलाधिकारी, उत्तर सागर द्वारा अवगत कराया गया है कि इस 25.35 हेक्टेयर अतिक्रमण में से 0.675 हेक्टेयर पर वन अधिकार अधिनियम, 2006 के तहत वनाधिकार पत्र दिया गया है। शेष अतिक्रमण पर किसी प्रकार का वनाधिकार नहीं है तथा इसे भारतीय वन अधिनियम, 1927 के तहत कार्यवाही कर आवेदक संस्था को उपलब्ध कराया जायेगा।

C	As per DSS analysis, it is reported that in the revised KML file of proposed torest diversion as uploaded on PARIVESH, a new feature is added near the submergence area and the details of the same is not furnished. State Government may submit their comments.	इस संबंध में आवेदक संस्था ने अवगत कराया है कि पुनरीक्षित प्रस्ताव में विद्युत लाईनों की KML फाईल सांकेतिक रूप से दर्शाई गई है। इस सांकेतिक KML फाईल का रकबा प्रस्ताव में सम्मिलित नहीं है।
D	As per DSS analysis, it is reported that approx. 22.34 Ha area of CA site namely Muderi (Khasra No 54) proposed in the instant project is overlapping with the CA site of another project having File No. 8-11/2018-FC Kadan Medium Project in which Inprinciple approval has already been accorded by this Ministry. One CA patch namely Pitholi (Khasra No. 1) having an area of 51 ha is already having plantation work done in the past. The state govt is accordingly required to give additional sites for CA.	भारत सरकार द्वारा पत्र क्रमांक F No. 8-13/2015-FC दिनांक 11.07.2018 से बीना मल्टीपरपस सिंचाई योजना के लिये 1024.44 हेक्टेयर वन भूमि प्रत्यावर्तित की है। इस प्रत्यावर्तित वनभूमि के विरूद्ध आवेदक संस्था ने 1190.56 हेक्टेयर गैर वनभूमि उपलब्ध कराई है। इस परियोजना में 03 बांध निर्मित किये जाने थे। परियोजना में स्वीकृति प्राप्त होने के बाद आवेदक संस्था ने 01 बांध का निर्माण स्थल परिवर्तित कर इसे डाउनस्ट्रीम में करने का निर्णय लिया। इस बांध में 405.94 हेक्टेयर वनभूमि प्रभावित हो रही थी। इस संबंध में भारत सरकार से अनुरोध करने पर प्रस्ताव को FAC में पुनः विचारार्थ रखा गया। भारत सरकार द्वारा पत्र दिनांक 06.12.2019 से प्रत्यावर्तित 1024.44 हेक्टेयर के स्थान पर 618.50 हेक्टेयर वनभूमि प्रत्यावर्तित की। साथ ही अतिरिक्त रूप से वृक्षारोपण हेतु उपलब्ध गैर वनभूमि एवं नेट प्रजेंट वैल्यू का समायोजन भविष्य की योजना में करने के निर्देश दिये। इस प्रकार आवेदक संस्था से 1190.56 हेक्टेयर गैर वनभूमि की राशि पूर्व में ही प्राप्त की जा चुकी है। ग्राम पिथौली में प्राप्त 50 हेक्टेयर गैर वनभूमि में से 29 हेक्टेयर रकबे में वृक्षारोपण हो चुका है। इसी प्रकार ग्राम मुंडैरी में भी 70 हेक्टेयर रकबे में वृक्षारोपण हो चुका है। ग्राम मुंडैरी में जो भूमि कड़ान परियोजना के लिये आवंटित की गई है उसकी मौके पर जांच कर ली जायेगी तथा यदि इस भूमि का कोई भाग बण्डा परियोजना में ओवरलेप हो रहा है तो कड़ान परियोजना में अंयंत्र गैर वनभूमि प्राप्त की जायेगी।

E	The revised tree enumeration details for the revised proposal of 530.85 ha forest land shall be submitted.	वनमण्डलाधिकारी, उत्तर सागर ने अवगत कराया है कि अतिरिक्त रूप से जोड़ी गई 25.35 हेक्टेयर वनभूमि में कोई वृक्ष मौजूद नहीं है। अतः प्रभावित वृक्षों की संख्या यथावत रहेगी।
F	The approved CAT plan shall be submitted in accordance to Para 9.2 (vi) of Handbook, 2019 of F(C)Act.	आवेदक संस्था द्वारा प्रस्तुत CAT plan की प्रति संलग्न है। इस CAT plan की तकनीकी स्वीकृति की प्रति भी संलग्न है।

अतः अनुरोध है कि प्रकरण में भारत सरकार की सैद्धान्तिक स्वीकृति प्राप्त कर अवगत कराने का कष्ट करें।

संलग्नः–उपरोक्तानुसार।

08/04/2021

(सुनील अग्रवाल)
अपर प्रधान मुख्य वन संरक्षक (भू–प्रबंध)
मध्यप्रदेश, भोपाल

पृ. क्रमांक/एफ–3/97/2018/10–11/12/1354 भोपाल, दिनांक 08-04-2021

प्रतिलिपिः–

1. प्रमुख अभियंता, जल संसाधन विभाग, 1250, तुलसी नगर, भोपाल, मध्यप्रदेश।
2. आयुक्त कमाण्ड क्षेत्र विकास, जल संसाधन विभाग, विश्वैश्वरैया भवन,कोलार तिराहे के पास, एम.ए.सी.टी. रोड, भोपाल मध्यप्रदेश।
3. मुख्य वन संरक्षक, (क्षेत्रीय) सागर वृत्त सागर, मध्यप्रदेश।
4. वनमंडलाधिकारी, सामान्य वनमंडल उत्तर सागर, मध्यप्रदेश।
5. परियोजना प्रबंधक, बीना (पी.एम.यू.) जल संसाधन विभाग सागर, मध्यप्रदेश।

की ओर सूचनार्थ अग्रेषित।

08/04/2021

अपर प्रधान मुख्य वन संरक्षक (भू–प्रबंध)
मध्यप्रदेश, भोपाल

कार्यालय प्रधान मुख्य वन संरक्षक (कक्ष–भू प्रबंध), सतपुड़ा भवन, मध्यप्रदेश, भोपाल

तकनीकी स्वीकृति आदेश

आदेश क्रं./एफ–3/97/2018/10–11/12/15 भोपाल, दिनांक 08-04-2021

भारत सरकार द्वारा वन (संरक्षण) अधिनियम, 1980 के तहत दिनांक 08.03.2019 से प्रभावशील गाईड लाईन के अनुसार प्रधान मुख्य वन संरक्षक एवं वन बल प्रमुख म0प्र0 भोपाल के आदेश क्रमांक/एफ–3/2019/10–11/03, दिनांक 31.05.2019 से प्रदत्त अधिकारों के अन्तर्गत गठित समिति की बैठक दिनांक 07.04.2021 को आयोजित की गयी। परीक्षण उपरांत केचमेन्ट एरिया ट्रीटमेन्ट प्लान कार्य की तकनीकी स्वीकृति निम्नानुसार प्रदान की जाती है :–

वनमण्डल का नाम	योजना का नाम	उपचार हेतु रकबा (हे0 में)	राशि (रूपये मे)
उत्तर वनमंडल सागर	बंडा वृहद सिंचाई परियोजना (530.85 हेक्ट.)	वनभूमि–34174.08	12,46,95,335
		राजस्व भूमि–114898	10,40,66,611
		योग–	**22,87,61,946**

(राशि रूपये बाईस करोड सत्यासी लाख इक्सठ हजार नों सौ छियालीस)

उक्त तकनीकी स्वीकृति निम्नलिखित शर्तो के अधीन रहेंगी :–

1. वनभूमि रकबा 34174.08 हेक्टेयर में कार्य वन विभाग द्वारा कराया जावेगा।
2. राजस्व भूमि रकबा 114898 हेक्टेयर में कार्य आवेदक विभाग द्वारा कराया जावेगा।
3. प्रस्तुत केचमेन्ट एरिया ट्रीटमेन्ट प्लान के प्रस्ताव पर सहमति दी जाती है। यदि प्रस्ताव मे कोई परिवर्तन स्थानीय परिस्थितियों को दृष्टिगत रखते हुए आवश्यक हो तो अनुमोदन उपरांत कराएं।
4. वनमण्डलाधिकारी, उत्तर सागर इस स्वीकृति के अधीन केचमेन्ट एरिया ट्रीटमेन्ट प्लान कार्य हेतु प्रशासकीय स्वीकृति प्राप्त होने पर प्राप्त राशि के अंतर्गत ही व्यय करेंगें, केवल तकनीकी स्वीकृति के आधार पर कार्य प्रारंभ न किया जावें। कैम्पा कक्ष द्वारा दिये आवंटन के अनुसार ही कार्य कराया जावें।
5. इस कार्य की उपयोगिता प्राक्कलन अनुसार कार्य के लिये है।
6. कार्य का संपादन तकनीकी स्वीकृति के साथ संलग्न प्राक्कलन एवं मानचित्र में दर्शित तकनीकी मापदण्डों के अनुसार कराया जावें। कार्य के दौरान स्थल की भौगोलिक स्थिति के अनुसार किसी प्रकार के परिवर्तन/संशोधन की आवश्यकता होने पर सक्षम अधिकारी से पूर्व अनुमति लेना अनिवार्य होगा।
7. केचमेन्ट एरिया ट्रीटमेन्ट प्लान अंतर्गत कार्य हेतु स्थल उपयुक्तता प्रमाण–पत्र प्राप्त कर ही कार्य किया जावें।
8. केचमेन्ट एरिया ट्रीटमेन्ट प्लान कार्य की गुणवत्ता पर सतत निगरानी रखी जावें।
9. कोई भी सामग्री क्रय करते समय भण्डार क्रय नियम का पालन करें।
10. कार्य प्रांरभ के पूर्व विस्तृत कार्यवार स्थल अनुरूप डी.पी.आर. तैयार कर कार्य प्रांरभ करावें।

07/04/2021

(सुनील अग्रवाल)
अपर प्रधान मुख्य वन संरक्षक (भू–प्रबंध)
मध्यप्रदेश, भोपाल

पृ. क्रं./एफ–3/97/2018/10–11/12/1352 भोपाल, दिनांक 08-04-2021

प्रतिलिपि:–

1. अपर प्रधान मुख्य वन संरक्षक (विकास), सतपुडा भवन, मध्यप्रदेश भोपाल।
2. अपर प्रधान मुख्य वन संरक्षक (कैम्पा), सतपुडा भवन, मध्यप्रदेश भोपाल।
3. प्रमुख अभियंता, जल संसाधन विभाग, 1250, तुलसी नगर, भोपाल, मध्यप्रदेश।
4. मुख्य वन संरक्षक, (क्षेत्रीय) सागर वृत्त सागर, मध्यप्रदेश।
5. वनमंडलाधिकारी, सामान्य वनमंडल उत्तर सागर, मध्यप्रदेश।
6. परियोजना प्रबंधक, बीना (पी.एम.यू.) जल संसाधन विभाग सागर, मध्यप्रदेश की ओर सूचनार्थ प्रेषित।

07/04/2021

अपर प्रधान मुख्य वन संरक्षक (भू–प्रबंध)
मध्यप्रदेश, भोपाल

GOVERNMENT OF MADHYA PRADESH

WATER RESOURCES DEPARTMENT

CATCHMENT AREA TREATMENT PLAN

OF

BANDA MAJOR IRRIGATION PROJECT

PROJECT DIRECTOR
BINA PROJECT MANAGEMENT UNIT
WATER RESOURCES DEPARTMENT
SAGAR (M.P.)

CATCHMENT AREA TREATMENT PLAN

NEED FOR CATCHMENT AREA TREATMENT

It is a well-established fact that reservoirs formed by dams on rivers are subjected to sedimentation. The process of sedimentation embodies the sequential processes of erosion, entrainment, transportation, deposition and compaction of sediment. The steady erosion and sediment in reservoir reduces its capacity, and thus affecting the water availability for the designated use. The eroded sediment from catchment when deposited on streambeds and banks causes braiding of river reach. The removal of top fertile soil from catchment adversely affects the land productivity in the area. Thus, a well-designed Catchment Area Treatment (CAT) Plan is essential to ameliorate the above mentioned adverse effects of soil erosion. Soil erosion can be defined as detachment, transportation and deposition of soil particles from one place to other by means of transporting agent like air, water or animals. Soil erosion is mainly affected by rainfall intensity and runoff, slope gradient and length, soil erodibility and vegetation cover (land use pattern). Therefore, study of erosion and sediment yield from catchments are of great importance. Soil erosion leads to:

- loss in production potential
- reduction in infiltration rates
- reduction in water-holding capacity
- loss of nutrients
- increase in tillage operation costs
- reduction in water supply

To control the rate of soil erosion in the catchment, Catchment Area Treatment (CAT) is an ineluctable part. The CAT plan pertains to preparation of a management plan for treatment of erosion prone areas through adequate preventive measures. An effective CAT plan is a key factor to make the project eco-friendly and sustainable. Thus, a well-designed Catchment Area Treatment (CAT) Plan is essential to ameliorate the above mentioned adverse process of soil erosion. CAT plan essentially consist of following steps.

1. Calculation of soil erosion using Revised Universal Soil Loss Equation (RUSLE), combined with Remote Sensing (RS) and Geographic Information System (GIS) technologies.
2. Prioritizing the areas for treatment using Silt Yield Index (SYI).

3. Planning of suitable erosion control measures.
4. Cost estimation for CAT plan.

2.2 RIVER SYSTEM

River Dhasan is a right bank tributary of river Betwa, ultimately part of Yamuna Basin. This river originates near village Bankori of Begamganj tehsil in Raisen district of Madhya Pradesh. The river forms the southeastern boundary of the Lalitpur District of Uttar Pradesh state. Total length of the river is about 365 km, out of which around 240 km lies in Madhya Pradesh, around 54 km common boundary between Madhya Pradesh and Uttar Pradesh and around 71 km in Uttar Pradesh.

2.3 CATCHMENT AREA

The catchment area of the project up to the proposed dam site is 1490.72 km^2. The elevation of the catchment varies from about El. 435.0m to about El. 715.0m. Length of Banda river up to the proposed dam site is around 103.0 km. The major left bank tributaries of river Dhasan in the catchment area upto dam site are Pateria Nala and Sandhani Nala while, the major right bank tributaries are Kongra Nala, Kadan River and Barel Nala. Map showing catchment area of Banda major irrigation project is given at **Figure 2.1**.

2.4 METHODOLOGY ADOPTED FOR THE STUDY

The various steps, covered in the study, are as follows:

- Defining study area
- Defining data requirement
- Data acquisition and preparation
- Output presentation

The above mentioned steps are briefly described in the following paragraphs:

2.4.1 Defining Study Area

Purpose of the study is preparation of CAT plan for the catchment of Banda Major Irrigation Project. Since Kadan medium irrigation project is proposed on river Kadan, a right bank tributary of Dhasan river therefore, study area is defined as free draining catchment area of Banda major irrigation project. Free draining catchment area has been delineated as catchment area of Dhasan river upto the dam site of proposed Banda major irrigation project excluding the catchment area of Kadan river upto the dam site of proposed Kadan medium irrigation project. Map showing free draining catchment area of Banda major irrigation project is given at **Figure 2.1**.

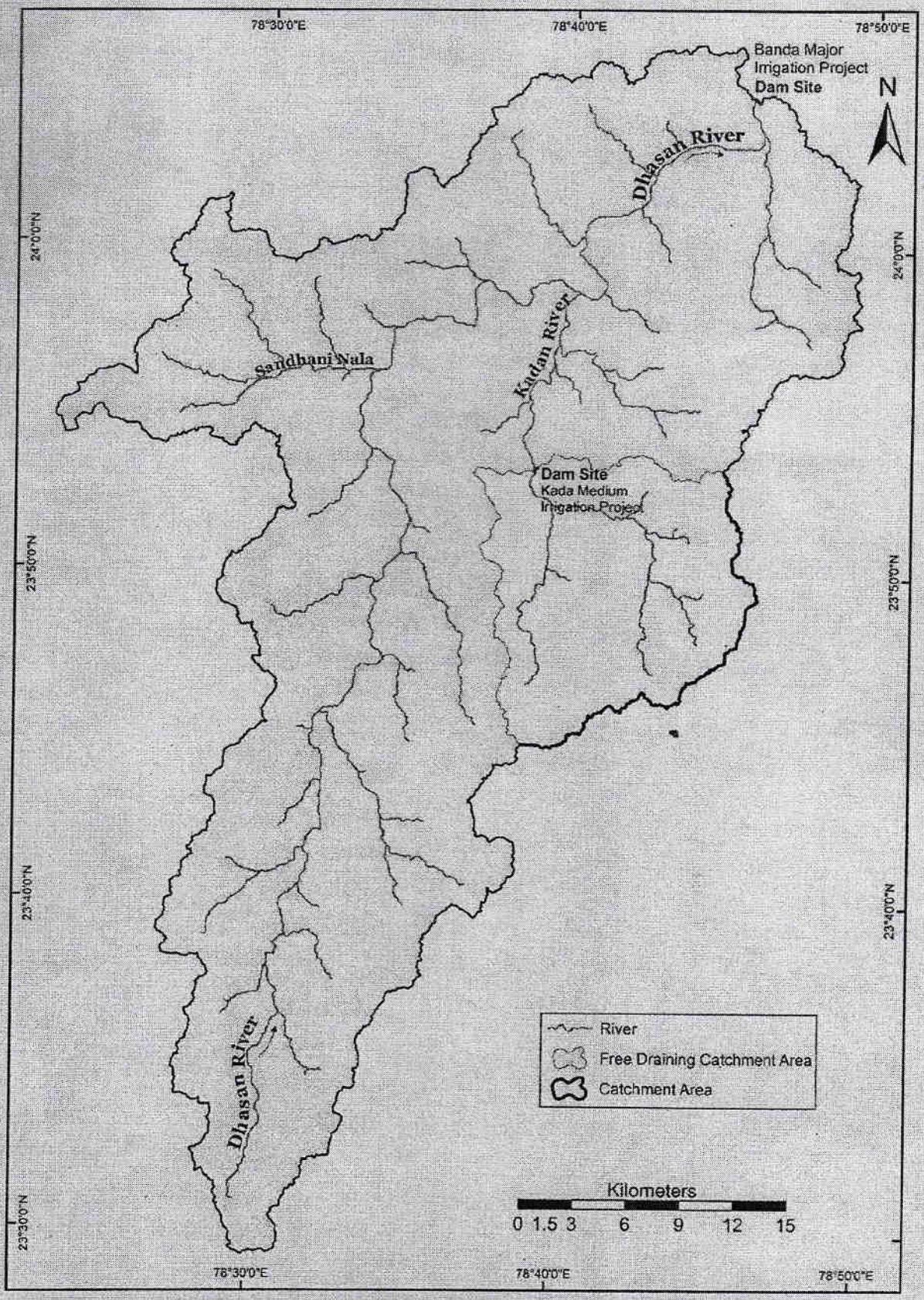

Figure 2.1: Catchment Area and Free Draining Catchment Area Map of Banda Major Irrigation Project

In order to plan watershed management and to formulate action plans it requires sub-watershed delineation, therefore, free draining catchment area was further delineated into sub-watersheds. For the delineation of sub-watershed, Watershed Atlas of India prepared by Soil and Land Use Survey of India (SLUSI) has been referred.

Soil and Land Use Survey of India (SLUSI) has Watershed Atlas of India under digital environment using GIS and produced a Digital Watershed Atlas (DWA) where the delineation and codification of sub-watersheds in the country has been undertaken in GIS environment. The delineation for DWS has been done in seven stages starting with Water Resource Regions and their subsequent division and subdivisions into Basins, Catchments, Sub-catchments, Watershed, Sub watershed and Micro-watersheds in decreasing size of the delineated hydrologic unit.

As per Watershed Atlas of India, the free draining catchment area of Banda major irrigation project falls in 17 sub-watersheds. Out of these 17 sub-watersheds, 13 sub-watersheds fall completely within the free draining catchment area while 4 sub-watersheds fall partially within the free draining catchment area. The nomenclature of sub-watersheds has been assigned as follows: Ganga Region (2); Yamuna Basin (2C); Betwa confluence to Yamuna Catchment (2C3); Betwa Sub-Catchment (2C3C); Karawan (2C3C6) and Kongra (2C3C7) Watersheds; and 17 sub-watersheds. The detail of sub-watersheds delineated for the free draining catchment area is given below (**Table 2.1 and Figure 2.2**).

Table 2.1: Names and Codes of Watersheds Delineated

S. No.	Water Resource Region	Basin	Catchment	Sub-Catchment	Watershed	Sub-Watershed Code	Sub-Watershed Area (ha)
1.	Ganga (2)	Yamuna (2C)	Betwa confluence to Yamuna (2C3)	Betwa (2C3C)	Karawan (2C3C6)	2C3C6b	205.77
2.						2C3C6c	764.91
3.						2C3C6d	11160.79
4.						2C3C6f	9535.63
5.						2C3C6g	6679.24
6.						2C3C6h	8285.59
7.						2C3C6j	3420.62
8.						2C3C6n	4208.34
9.						2C3C6p	6851.02
10.						2C3C6q	12922.02
11.					Kongra (2C3C7)	2C3C7a	8196.92
12.						2C3C7b	4927.39
13.						2C3C7c	9922.75
14.						2C3C7d	7695.45
15.						2C3C7f	8723.35

S. No.	Water Resource Region	Basin	Catchment	Sub-Catchment	Watershed	Sub-Watershed Code	Sub-Watershed Area (ha)
						2C3C7g	5045.61
16.						2C3C7h	10728.43
17.							**149072.08**
	TOTAL						

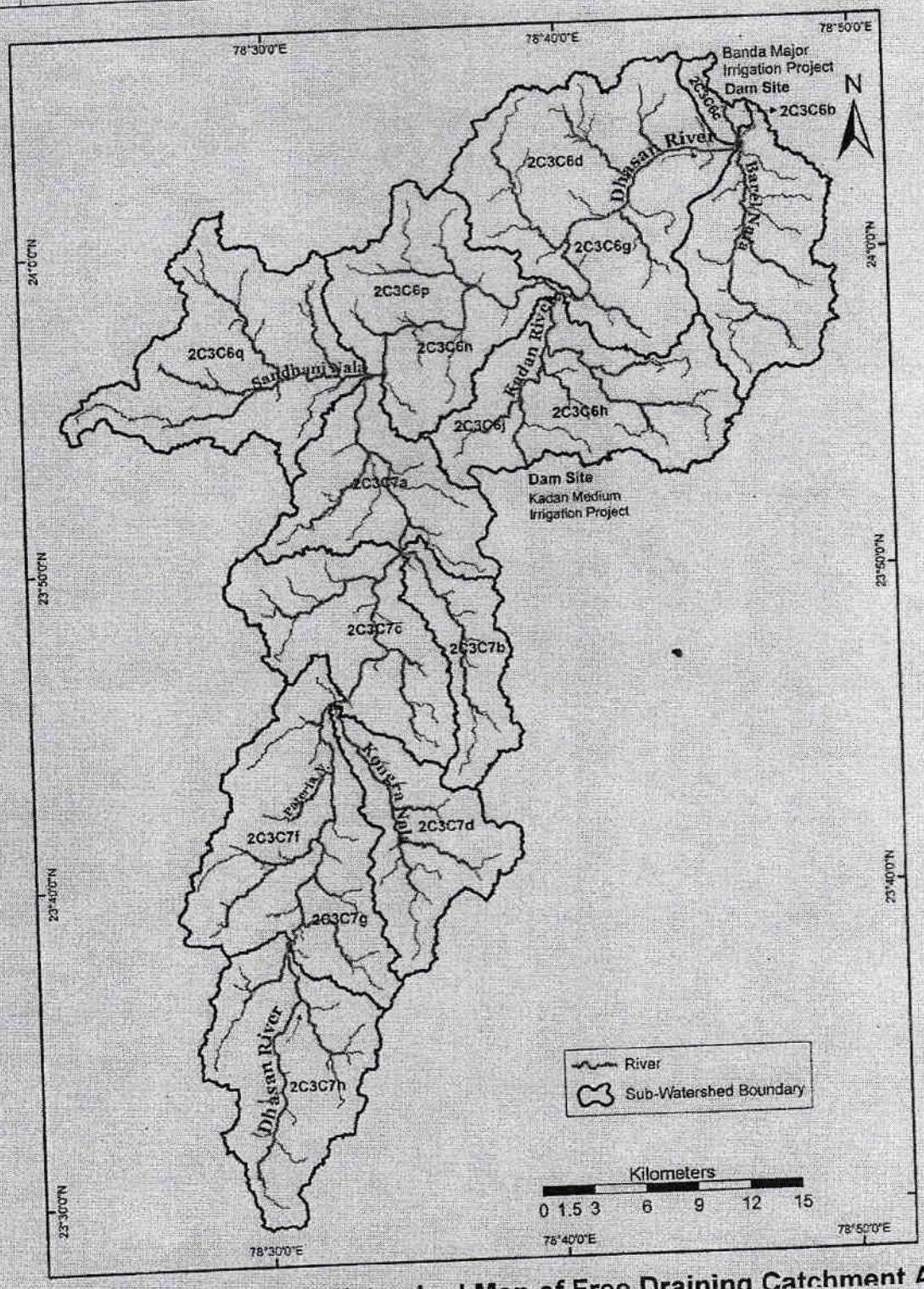

Figure 2.2: Sub-Watershed Map of Free Draining Catchment Area

2.4.2 Defining Data Requirement

Soil loss has been calculated through RUSLE (Revised Universal Soil Loss Equation) model which is computed by the following equation:

Soil Loss (A) = R*K*LS*C*P

Wherein;

A = Soil loss (Tons/ha/year)

R is Rainfall & Runoff Erosivity Factor (MJ mm/ha^{-1}/h^{-1}/year^{-1}), which depends upon the annual average rainfall in mm. Data required for R factor is rainfall intensity.

K is Soil Erodibility Factor (Tons/ha/h/ha^{-1}/MJ^{-1}/mm^{-1}), which depends on the organic matter, texture permeability and profile structure of the soil. Also, it is a constant value for each soil type. Data required for K factor is soil type.

LS is Topographic Factor (dimensionless) which depends upon flow accumulation and steepness and length of slope in the area. Data required for LS factor is slope length and slope gradient.

C = Vegetation Cover and Crop Management Factor (dimensionless), which is the ratio of bare soil to vegetation and non- photosynthetic material. It is a constant value for each land use category. Data required for C factor is land use/ land cover.

P is Conservation Supporting Practice Factor (dimensionless), which takes into account specific erosion control practices like contour bunding, bench terracing etc.

2.4.3 Data Acquisition and Preparation

The base map of study area as already discussed was prepared from Survey of India Toposheets at 1:50000 scale. The data on various aspects was collected from different sources. The rainfall data in the Study area was procured from the Tropical Rainfall Measuring Mission (TRMM) of NASA from their website https://pmm.nasa.gov/data-access/downloads/trmm. Soil map of the study area was prepared from soil map of Madhya Pradesh procured from Regional Centre of National Bureau of Soil Survey & Land Use Planning (NBSS&LUP), New Delhi.

For the preparation of DEM and preparation of Slope map, Shuttle Radar Topography Mission (SRTM) 3 Arc-Second Global Digital Terrain Elevation Data (DTED) data has been used. For the preparation of land use/ land cover, map prepared by National Remote Sensing Centre (NRSC), Indian Space Research

Organisation (ISRO) of Dept. of Space with Remote Sensing Applications Centre, MP Council of Science & Technology as partners has been used.

2.4.3.1 Rainfall Erosivity (R) Factor

R factor is a function of the falling raindrop and rainfall intensity and is estimated as the product of the kinetic energy (E) of the raindrop and the maximum intensity of rainfall (I_{30}) over duration of 30 min in a storm. The erosivity of rain is calculated for each storm, and these values are summed up for each year.

In this study, the storm wise rainfall data were not available for the computation of rainfall erosivity factor (R); therefore, the relationship between seasonal value of R and average rainfall has been used. The rainfall erosivity factor has been defined as R = 81.5 + 0.38X, where, R is the average seasonal erosivity factor (MJ mm/ha^{-1}/h^{-1}/year^{-1}), and X is the annual average rainfall (mm).

For the estimation of rainfall erosivity in the free draining catchment area, average rainfall of 10 years has been taken from the Tropical Rainfall Measuring Mission (TRMM) data (**Figure 2.3**). In the absence of site specific periodic data, TRMM data from the year 1998 to 2009 has been used for the calculation of R factor. As can be seen in the **Figure 2.3,** the free draining catchment area comprises of three average annual rainfall ranges i.e. <500 mm/year, 500-1000 mm/year and 1000-2000 mm/year. Similarly, free draining catchment area was divided into three zones and was assigned with X values 1500 mm, 750 mm and 250 mm for the average annual rainfall range of 1000-2000 mm/year, 500-1000 mm/year and <500 mm/year respectively. The R factors thus arrived are 176.5, 366.5 and 651.5 for the zones having average annual rainfall range of <500 mm/year, 500-1000 mm/year and 1000-2000 mm/year respectively and zones have been shown on study area map given at **Figure 2.4**.

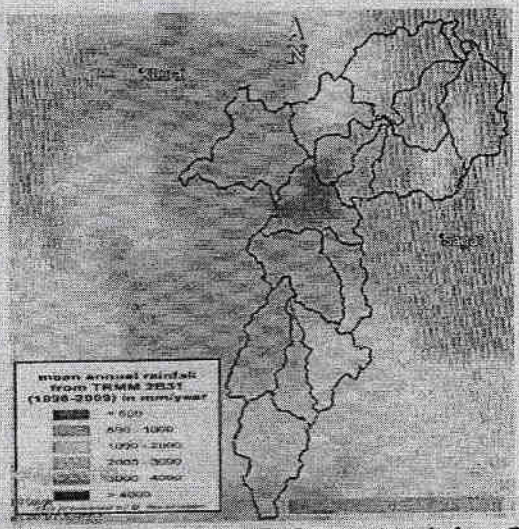

Figure 2.3: Average Annual Rainfall Map of Free Draining Catchment Area as per TRMM

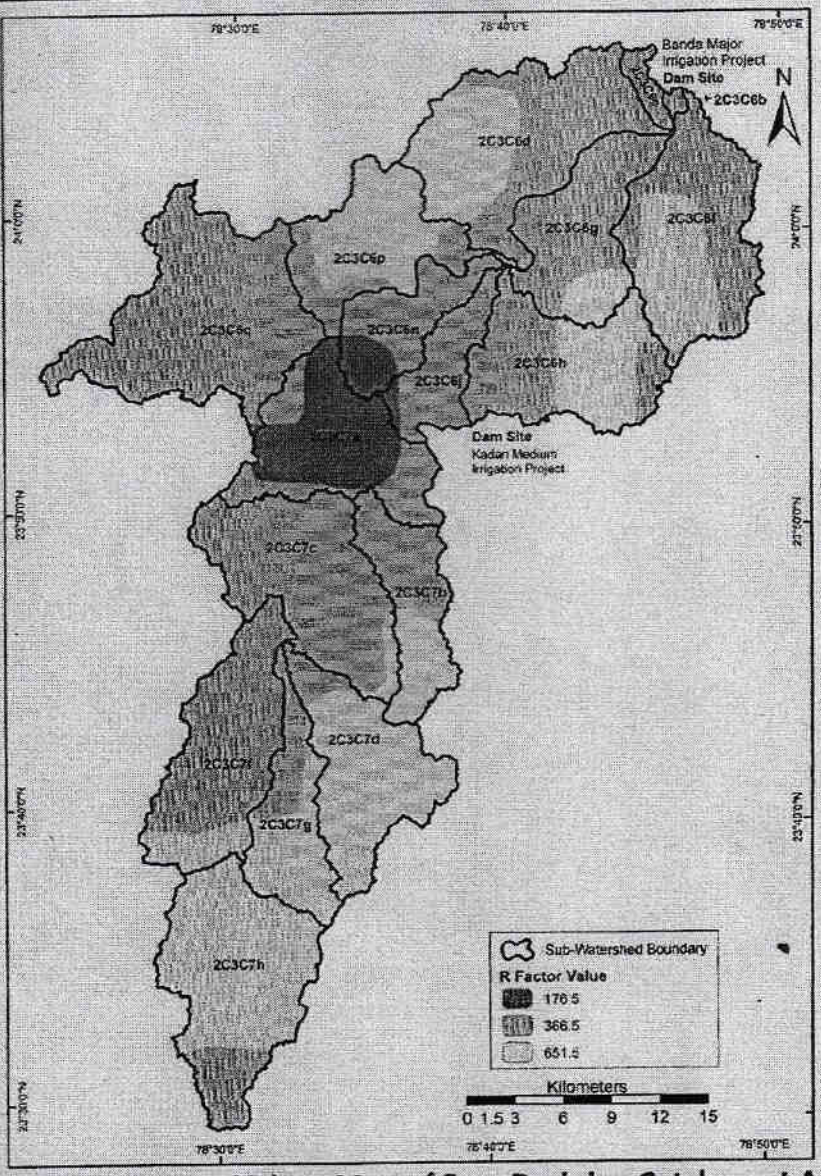

Figure 2.4: R Factor Values Map of Free Draining Catchment Area

2.4.3.2 Soil Erodibility (K) Factor

The K factor is an expression of the inherent erodibility of the soil or surface material at a particular site under standard experimental conditions. It is a function of the particle-size distribution, organic-matter content, structure, and permeability of the soil or surface material. Prior to deciding the K values, soil map for the area is prerequisite. Soil map procured from NBSS&LUP, Nagpur was digitized. The dominant soil unit is 315 (28.69%), which is characterised by deep, moderately well drained, calcareous, clayey soils on sloping plain land with narrow valleys with moderate erosion; followed by soil unit 314 (18.17%), which is characterised by moderately deep, well drained, calcareous, clayey soils on gently sloping plateau with escarpments with moderate erosion. Soil map has been shown in **Figure 2.5**. The legend for soil unit classes is given in **Table 2.2**.

Table 2.2: Description of Soil Units in the Free Draining Catchment Area

Soil Unit	Main Group	Sub Group	Area (ha)	Area (%)
200	**Loamy, kaolinitic, hyperthermic, Lithic Ustorthents** Very shallow, well drained, loamy soils on moderately sloping hills with escarpments with severe erosion, *associated with:*	**Fine-loamy, kaolinitic, hyperthermic, Lithic Ustochrepts** Slightly deep, well drained, loamy soils on gently sloping with moderate erosion and slightly stony.	1021.04	0.86
305	**Fine-loamy, mixed, hyperthermic, Typic Ustochrepts** Deep, well drained, loamy soils on gently sloping hills with upper pediments with moderate erosion, *associated with:*	**Clayey, mixed, (Cal.), hyperthermic, Lithic Ustochrepts** Shallow, well drained, calcareous, clayey soils on gently sloping with moderate erosion.	3135.18	2.63
306	**Fine-loamy, mixed, hyperthermic, Typic Ustochrepts** Slightly deep, well drained, loamy soils on moderately sloping hills with upper pediments with severe erosion, *associated with:*	**Fine-loamy, mixed, hyperthermic Typic Haplustalfs** Slightly deep, well drained, loamy soils on very gently sloping with moderate erosion.	14550.55	12.20
307	**Fine, mixed, (Cal.), hyperthermic, Vertic Ustochrepts** Deep, moderately well drained, calcareous, clayey soils on gently sloping hills with upper pediments with moderate erosion, *associated with:*	**Loamy, mixed, hyperthermic, Lithic Ustorthents** Very shallow, well drained, loamy soils on gently sloping with moderate erosion and slightly stony.	4675.34	3.92
309	**Loamy, mixed, hyperthermic, Lithic Ustorthents** Very shallow, somewhat excessively drained, loamy soils on moderately steep sloping hills with narrow valleys with severe erosion, *associated with:*	**Loamy, mixed, hyperthermic, Lithic Ustochrepts** Shallow, well drained, loamy soils on gently sloping with severe erosion and moderately stony.	3563.80	2.99
311	**Fine, montmorillonitic, hyperthermic, Vertic Ustochrepts** Deep, well drained, clayey soils on gently sloping plateau with escarpments with moderate erosion, *associated with:*	**Loamy-skeletal, mixed, hyperthermic, Lithic Ustorthents** Very shallow, somewhat excessively drained, loamy-skeletal soils on moderately sloping with severe erosion and strongly stony.	9740.75	8.17
312	**Fine, mixed, hyperthermic, Typic Ustochrepts** Slightly deep, well drained, clayey soils on very gently sloping plateau with escarpments with moderate erosion, associated with:	**Fine, mixed, hyperthermic, Typic Haplusterts** Deep, moderately well drained, clayey soils on moderately sloping with moderate erosion.	9823.94	8.24
314	**Fine montmorillonitic, (Cal.), hyperthermic, Typic Ustochrepts**	**Fine, montmorillonitic, (Cal.), hyperthermic, Typic**	21667.19	18.17

Soil Unit	Main Group	Sub Group	Area (ha)	Area (%)
	Moderately deep, well drained, calcareous, clayey soils on gently sloping plateau with escarpments with moderate erosion, *associated with:*	**Haplusterts** Deep, moderately well drained, calcareous, clayey soils on gently sloping with moderate erosion.		
315	**Fine montmorillonitic, (Cal.), hyperthermic, Typic Haplusterts** Deep, moderately well drained, calcareous, clayey soils on gently sloping plain land with narrow valleys with moderate erosion, *associated with:*	**Fine, montmorillonitic, (Cal.), hyperthermic, Vertic Ustochrepts** Deep, moderately well drained, calcareous, clayey soils on very gently sloping with moderate erosion.	34221.81	28.69
317	**Fine montmorillonitic, (Cal.), hyperthermic, Typic Haplusterts** Deep, moderately well drained, calcareous, clayey soils on very gently sloping intervening basin with moderate erosion, *associated with:*	**Fine, montmorillonitic, hyperthermic, Vertic Ustochrepts** Deep, moderately well drained, clayey soils on very gently sloping with moderate erosion.	16874.22	14.15
	TOTAL		**149072.08**	**100**

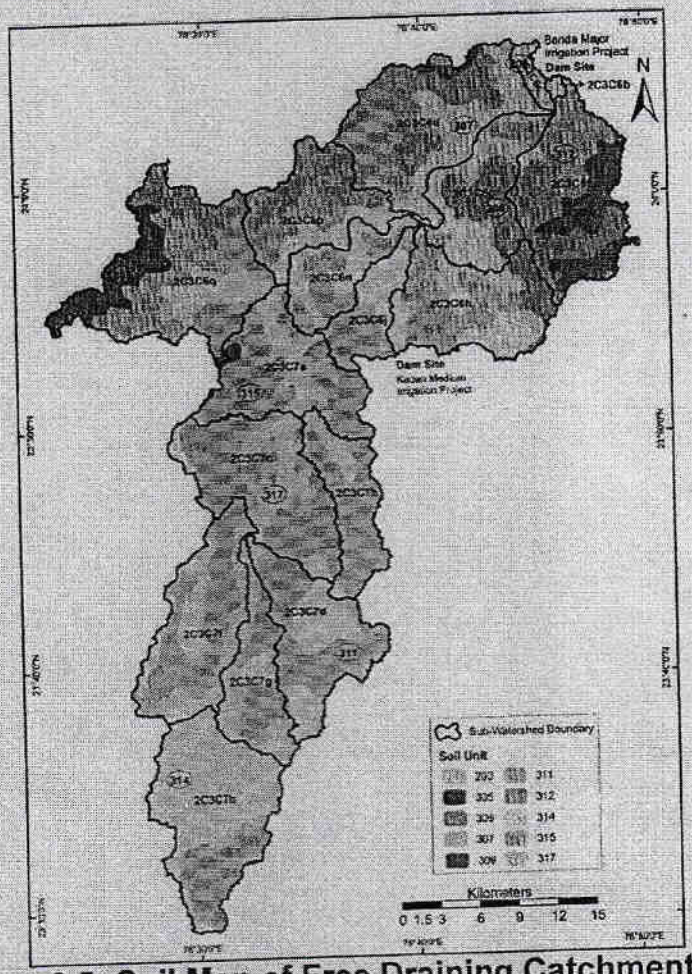

Figure 2.5: Soil Map of Free Draining Catchment Area

As per the soil map of the free draining catchment area, the soil can be classified in three major categories. deep with moderate erosion have low K values i.e. 0.15 because of high infiltration resulting in low runoff even though these particles are easily detached. Slightly to moderately deep with moderate erosion have moderate K value i.e. 0.20, because they are less susceptible to particle detachment and they produce runoff at moderate rates. Very shallow with severe erosion have high K value i.e. 0.325. Various classes of soil and the values of K are shown in **Figure 2.6** and given in **Table 2.3.**

Table 2.3: Soil Erodibility Factor for different Soil Types

S. No.	Soil Unit	Soil Type	Erosion Intensity	K Value
1	200, 306, 309	Very Shallow to Slightly Deep	Severe	0.325
2	312, 315	Slightly to Moderately Deep	Moderate	0.20
3	305, 307, 311, 315, 317	Deep	Moderate	0.15

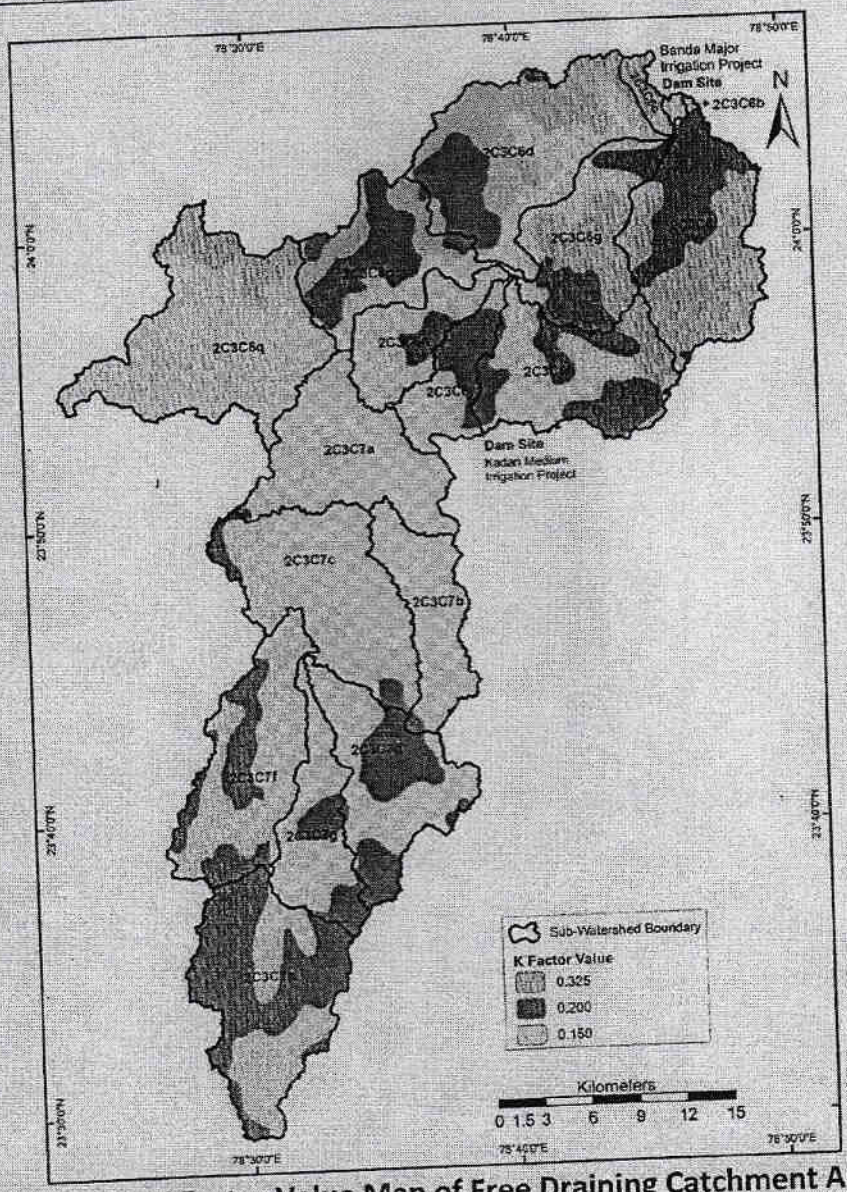

Figure 2.6: K Factor Value Map of Free Draining Catchment Area

2.4.3.3 Topographic (LS) Factor

The LS factor is an expression of the effect of topography, specifically hill slope length and steepness, on rates of soil loss at a particular site. The value of 'LS' increases as hill slope length and steepness increase, under the assumption that runoff accumulates and accelerates in the down-slope direction. Digital Elevation Model (DEM) and Slope of a particular area is prerequisite for LS factor. As already discussed, SRTM data has been used for DEM and the sae DEM has been used for the preparation of slope map. The slope map in degrees prepared for the free draining catchment area is given at **Figure 2.6.** As can be seen from the figure, in the free draining catchment area, the slope ranges from 0° to around 45°. The LS factor prepared for the free draining catchment area is given at **Figure 2.7.**

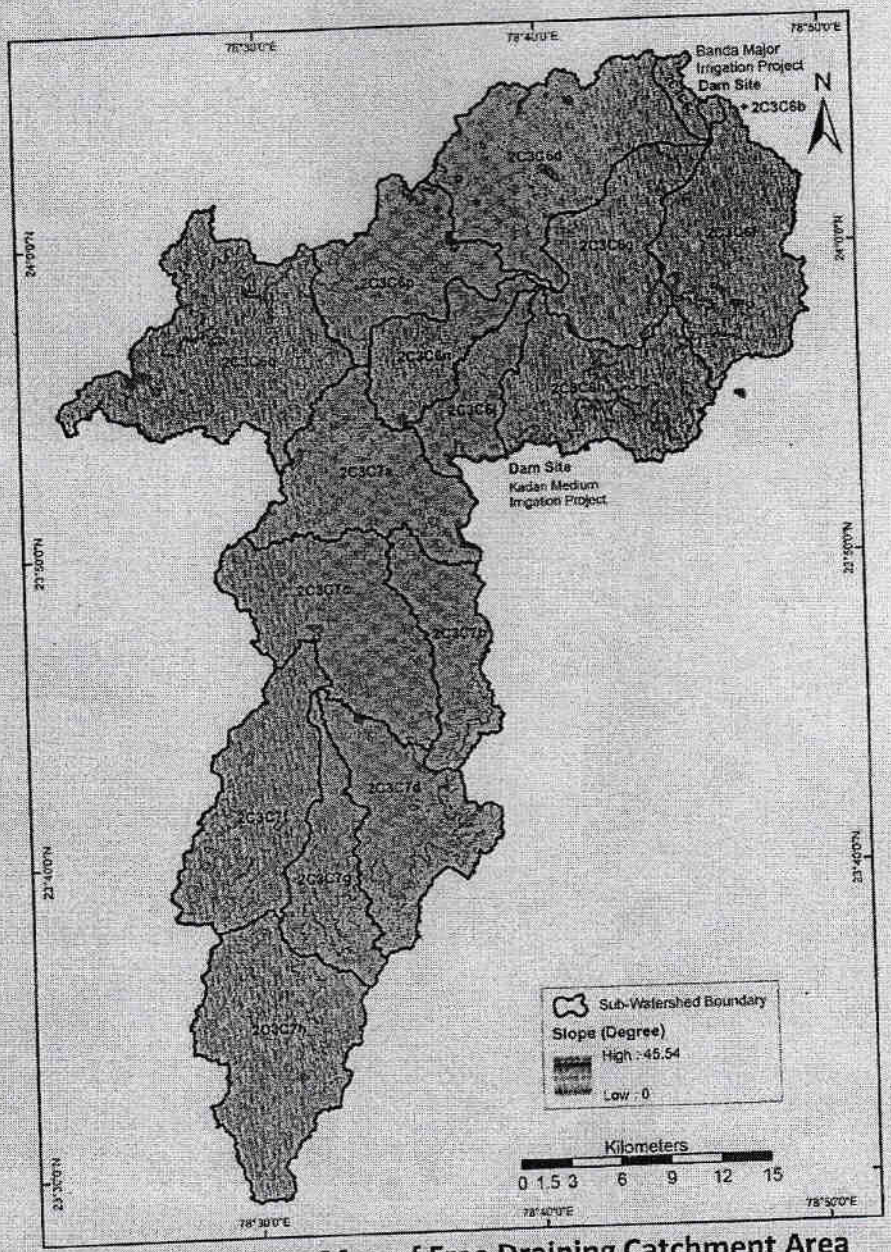

Figure 2.7: Slope Map of Free Draining Catchment Area

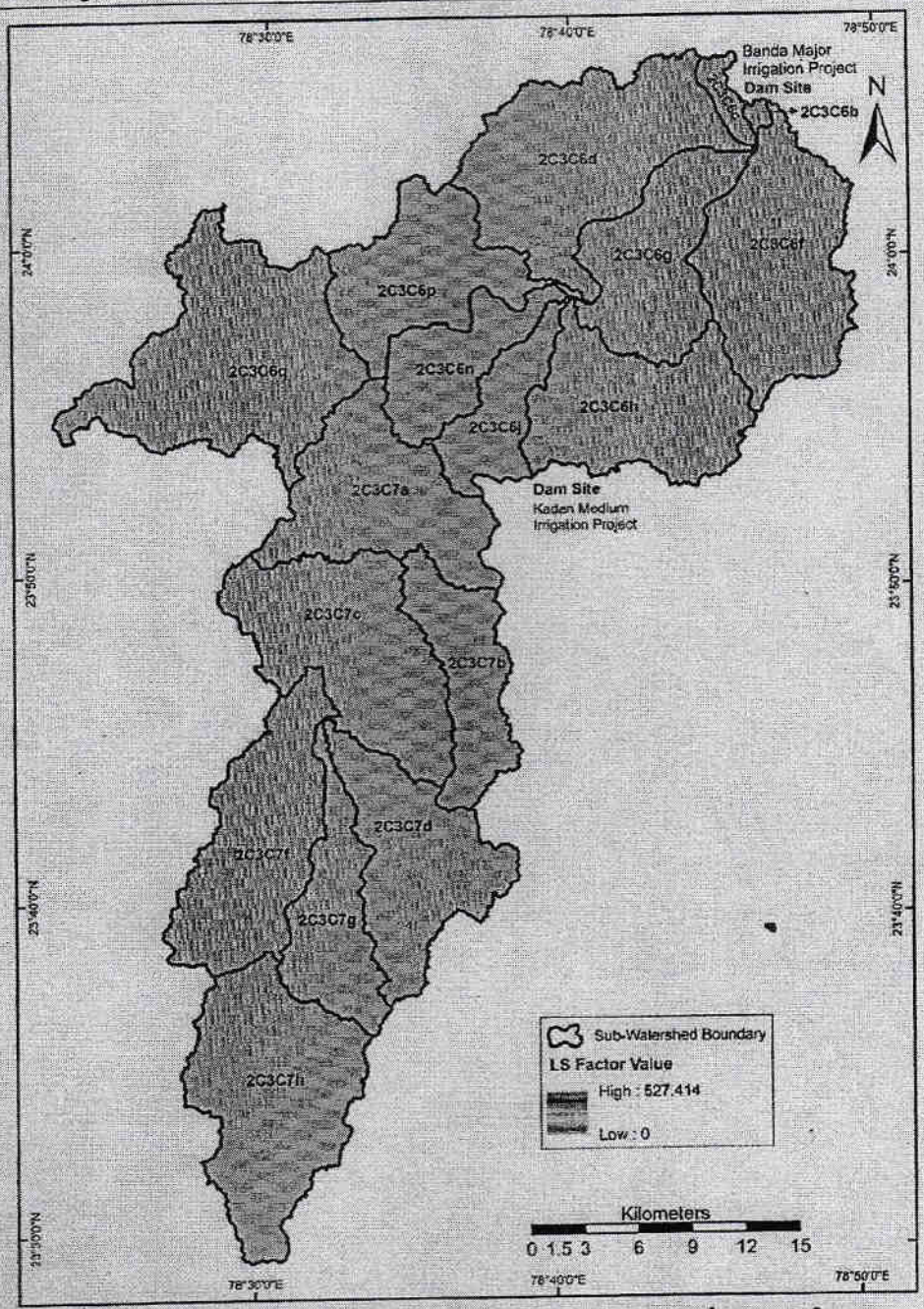

Figure 2.8: LS Factor Map of Free Draining Catchment Area

2.4.3.4 Crop Management (C) Factor

The C factor is an expression of the effect of surface cover and roughness, soil biomass, and soil-disturbing activities on rates of soil loss at a particular site. The value of C decreases as surface cover and soil biomass increase, thus protecting the soil from rain splash and runoff. In the present study, the land use/land cover map prepared by National Remote Sensing Centre (NRSC), Indian Space Research Organisation (ISRO) of Dept. of Space with Remote Sensing Applications Centre, MP Council of Science & Technology as partner has been used in the allocation of C factor for different land use classes.

The classified land use/ land cover map of the catchment area is shown as **Figure 2.9**. The land use/ land cover pattern of the catchment area has been given in **Table 2.4**. As can be seen from the map and table, the land use/ land cover pattern can be classified into nine classes, out of these nine classes, agricultural land covers the maximum area i.e. 62.28%, followed by deciduous forest, covering 20.26% and scrub land, covering 10.91%. Rest all the other classes covers the remaining 6.55%.

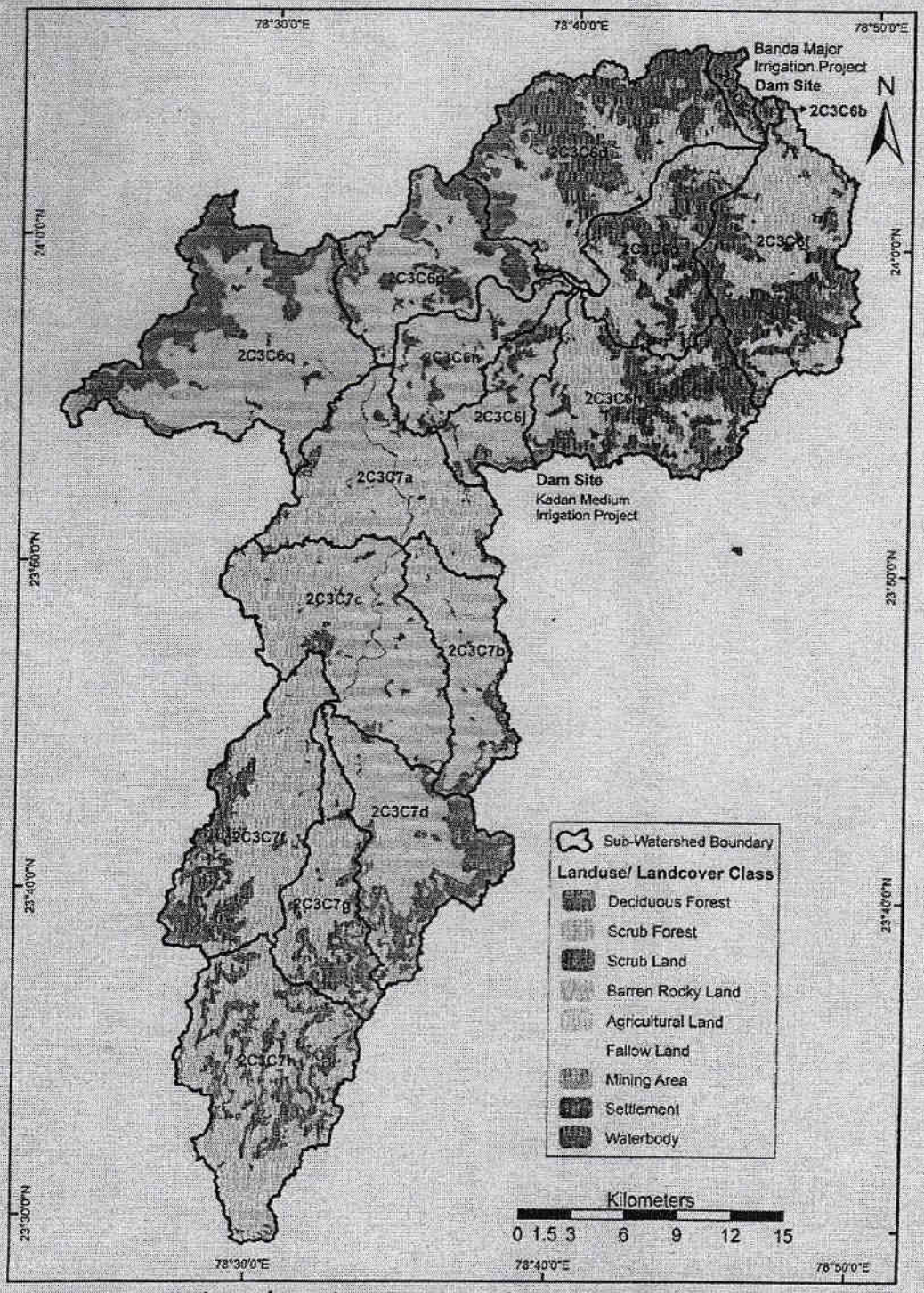

Figure 2.9: Land use/ Land cover Map of Free Draining Catchment Area

Table 2.4: Area falling under different land use/ land cover classes

Land use/ Land cover Classes	Area (ha)	Area (%)
Deciduous Forest	24169.97	20.26
Scrub Forest	3346.55	2.81
Scrub Land	13007.80	10.91
Barren Rocky Land	464.39	0.39
Agricultural Land	74289.23	62.28
Fallow Land	1795.95	1.51
Settlement	765.98	0.64
Mining	230.76	0.19
Waterbody	1203.20	1.01
Total	**149072.08**	**100**

Table 2.5 describes the cover management factors used in the model under different land use/land cover categories and the same is shown in the map of cover management factors given at **Figure 2.10**.

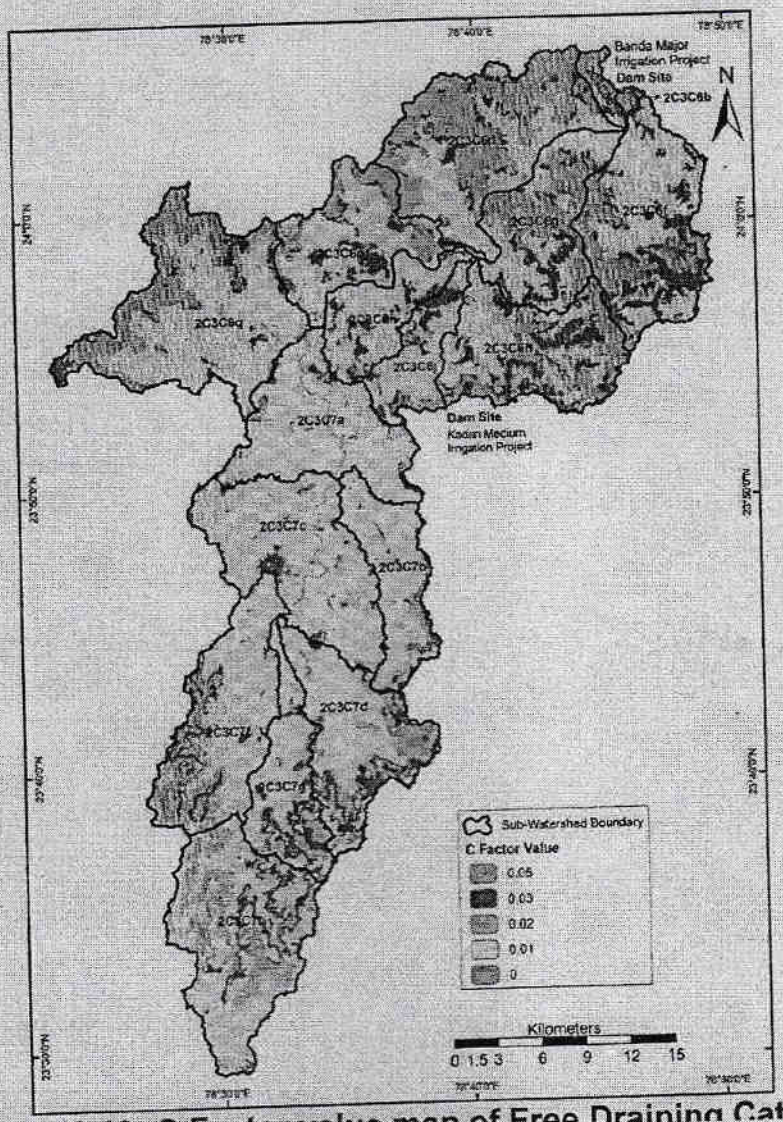

Figure 2.10: C Factor value map of Free Draining Catchment Area

Table 2.5: Crop Management Factor

S. No.	Land use/ Land cover Type	C Value
1	Deciduous Forest	0.02
2	Scrub Forest & Scrub Land	0.03
3	Fallow Land	0.05
4	Agricultural Land &	0.01
5	Barren rocky land Settlement, Mining Area & Waterbody	0.00

Conservation Support Practice (P) Factor

The P factor is an expression of the effects of supporting conservation practices, such as contouring, buffer strips of vegetation, and terracing, on soil loss at a particular site. It is the ratio of soil loss with specific support practice to the corresponding loss with up- or down-slope cultivation. In the present study, the P factor has been considered as 1.

Output Presentation

A thematic map for soil loss of the free draining catchment area has been prepared using RUSLE model mentioned in the above section. The free draining catchment area was then demarcated into different soil erosion intensity mapping units or classes based upon the extent of soil loss (see **Table 2.6 & Figure 2.11**). The free draining catchment area under different Erosion Intensity categories is given in **Table 2.7**. As can be seen from the figure and table, around 78% of the catchment area is prone to less than 1 tons/ha/annum soil erosion, i.e. under negligible erosion intensity category. Almost negligible i.e. 0.17% of its area is prone to Severe and Very Severe soil erosion.

Table 2.6: Soil Loss Range and Erosion Intensity Categories

S. No.	Soil loss in tons/hectare/annum	Erosion Intensity Category
1	<1	Negligible
2	1-5	Slight
3	5-10	Very Low
4	10-20	Low
5	20-40	Moderate
6	40-80	Severe
7	>80	Very Severe

Table 2.7: Area falling under different Erosion Intensity Categories

Erosion Intensity Category	Area (ha)	Area (%)
Negligible	93135.40	78.09
Slight	16530.60	13.86
Very Low	5597.86	4.69
Low	2896.79	2.43
Moderate	916.45	0.77
Severe	177.19	0.15
Very Severe	19.53	0.02
Total	**149072.08**	**100**

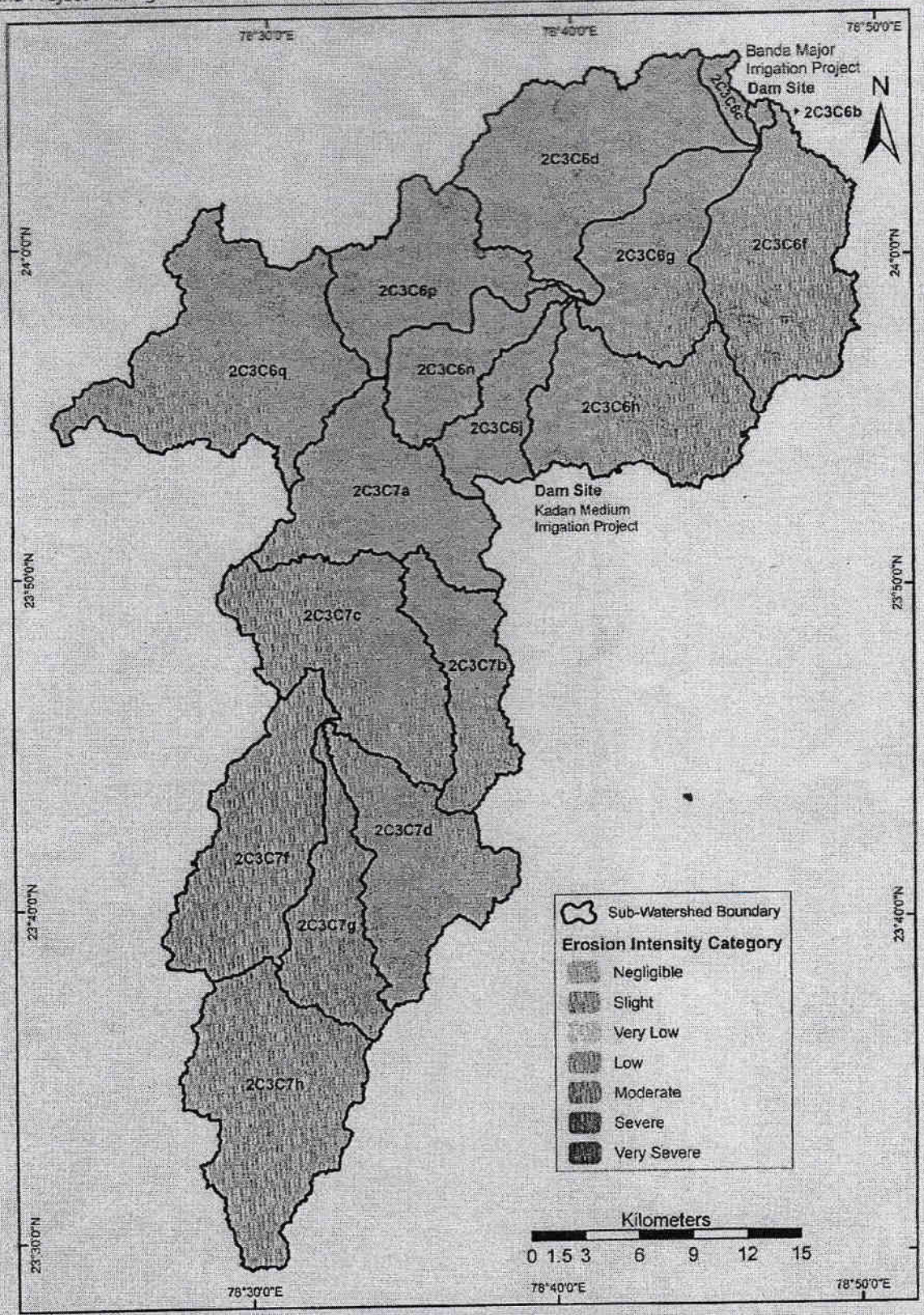

Figure 2.11: Erosion Intensity Map of Free Draining Catchment Area

2.5 PRIORTIZATION OF WATERSHEDS USING SILT YIELD INDEX (SYI) METHOD

'Silt Yield Index' (SYI), method has been used for prioritization of watersheds in the catchment for treatment. The Silt Yield Index (SYI) is defined as the Yield per unit area and SYI value for hydrologic unit is obtained by taking the weighted arithmetic mean over the entire area of the hydrologic unit by using suitable empirical equation. The Silt Yield Index Model (SYI) considers sedimentation as product of erosivity, morphometry and delivery ratio of a particular watershed and was conceptualized by Soil and Land Use Survey of India (SLUSI) as early as 1969 and has been operational since then to meet the requirements of prioritization of smaller hydrologic units within river valley project catchment areas. Silt yield index (SYI) was calculated using following empirical formula:

$$SYI = \frac{\Sigma (Ai * Wi) * Di * 100}{Aw}; \quad \text{where } i = 1 \text{ to } n$$

where,

Ai	=	Area of ith unit (EIMU)
Wi	=	Weightage value of ith mapping unit
n	=	No. of mapping units
Aw	=	Total area of watershed.
Di	=	Delivery ratio

2.5.1 Erosion Intensity Mapping Unit

Erosion Intensity Mapping Units (EIMU) are demarcated and defined as per the soil erosion intensity map prepared above. Various EIMU categories, such as Very Severe, Severe, Moderate, Low, Very Low, and Negligible & Slight (clubbed together), were then used to calculate watershed-wise SYI. Erosion Intensity Mapping Units (EIMU) is a composite expression of physiography, land use, and conservation practices adopted. While computing soil erosion intensity in a catchment all the factors (physiography, land use, and conservation practices) are already taken into consideration. Therefore, EIMUs are assumed as per the soil erosion intensity in the watershed.

2.5.2 Weightage Value

Each erosion intensity unit is assigned a weightage value. When considered collectively, the weightage value represents approximately the comparative erosion intensity. A basic factor of K = 10 was used in determining the weightage values. The value of 10 indicates a static condition of equilibrium between erosion and deposition. Any addition to the factor K (10+X) is suggestive of erosion in ascending order whereas subtraction, i.e. (10-X) is

indicative of deposition possibilities. The weightage value assigned to erosion mapping unit in a watershed ranges from 11-20.

2.5.3 Delivery Ratio

Delivery ratios were adjusted for each of the erosion intensity unit. The delivery ratio suggests the percentage of eroded material that finally finds entry into reservoir or river/ stream. Delivery ratios are assigned to all erosion intensity units depending upon their distance from the nearest stream. The criteria adopted for assigning the delivery ratio are as follows:

Nearest Stream	Delivery ratio
0 - 0.9 km	1.00
1.0 - 2.0 km	0.95
2.1 - 5.0 km	0.90
5.1 - 15.0 km	0.80
15.1 - 30.0 km	0.70

2.5.4 Silt Yield Index

The area of each of the mapping units is computed and silt yield indices of individual watersheds are calculated using the equations mentioned above. The SYI values for classification of various categories of erosion intensity rates are given in **Table 2.8.**

Table 2.8: Calculation of SYI in Watersheds

Sub-Watershed	EIMU	EIMU Area (hectare) (EA)	Weightage factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100)/SA
2C3C6b	1	0.00	20	0.00	0.9	1082
	2	0.00	20	0.00		
	3	0.00	18	0.00		
	4	0.27	16	4.32		
	5	1.67	14	23.38		
	6	203.83	12	2445.99		
Total		**205.77**		**2473.69**		**1082**
2C3C6c	1	1.17	20	23.42	0.9	1101
	2	1.23	20	24.58		
	3	3.53	18	63.45		
	4	14.03	16	224.41		
	5	42.87	14	600.17		
	6	702.09	12	8425.03		
Total		**764.91**		**9361.07**		**1101**
2C3C6d	1	2.29	20	45.89	0.9	1108
	2	15.27	20	305.42		
	3	101.90	18	1834.23		
	4	345.59	16	5529.44		
	5	683.38	14	9567.32		
	6	10012.35	12	120148.19		
Total		**11160.79**		**137430.49**		**1108**
2C3C6f	1	5.61	20	112.14	0.85	1059

Sub-Watershed	EIMU	EIMU Area (hectare) (EA)	Weightage factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100)/SA
	2	63.99	20	1279.77		
	3	203.05	18	3654.85		
	4	385.77	16	6172.26		
	5	547.17	14	7660.41		
	6	8330.04	12	99960.53		
Total		**9535.63**		**118839.96**		**1059**
2C3C6g	1	1.08	20	21.53	0.9	1098
	2	8.70	20	173.91		
	3	41.80	18	752.41		
	4	123.28	16	1972.48		
	5	261.90	14	3666.57		
	6	6242.49	12	74909.88		
Total		**6679.24**		**81496.77**		**1098**
2C3C6h	1	1.89	20	37.76	0.8	1006
	2	21.16	20	423.14		
	3	169.60	18	3052.76		
	4	522.47	16	8359.45		
	5	754.90	14	10568.59		
	6	6815.58	12	81786.99		
Total		**8285.59**		**104228.70**		**1006**
2C3C6j	1	0.00	20	0.00	0.85	1032
	2	0.91	20	18.20		
	3	10.41	18	187.33		
	4	50.30	16	804.78		
	5	103.16	14	1444.21		
	6	3255.85	12	39070.14		
Total		**3420.62**		**41524.66**		**1032**
2C3C6n	1	0.50	20	9.95	0.9	1085
	2	1.22	20	24.40		
	3	4.03	18	72.59		
	4	17.49	16	279.85		
	5	51.45	14	720.28		
	6	4133.65	12	49603.77		
Total		**4208.34**		**50710.84**		**1085**
2C3C6p	1	1.28	20	25.54	0.9	1110
	2	19.58	20	391.62		
	3	94.71	18	1704.78		
	4	212.96	16	3407.29		
	5	347.32	14	4862.53		
	6	6175.17	12	74102.09		
Total		**6851.02**		**84493.84**		**1110**
2C3C6q	1	0.09	20	1.80	0.8	974
	2	2.39	20	47.88		
	3	41.48	18	746.72		
	4	219.41	16	3510.49		
	5	576.68	14	8073.54		
	6	12081.97	12	144983.62		
Total		**12922.02**		**157364.05**		**974**
2C3C7a	1	0.09	20	1.80	0.9	1085
	2	0.64	20	12.73		
	3	5.71	18	102.75		
	4	47.75	16	763.99		
	5	97.03	14	1358.40		

Sub-Watershed	EIMU	EIMU Area (hectare) (EA)	Weightage factor (WF)	Silt Yield (SY) = EA * (WF)	Delivery Ratio (DR)	SYI = (SY*DR*100)/SA
	6	8045.70	12	96548.45		
Total		**8196.92**		**98788.13**		**1085**
2C3C7b	1	0.09	20	1.80	0.85	1032
	2	2.34	20	46.77		
	3	15.00	18	269.95		
	4	74.74	16	1195.91		
	5	156.98	14	2197.75		
	6	4678.24	12	56138.84		
Total		**4927.39**		**59851.02**		**1032**
2C3C7c	1	0.98	20	19.62	0.9	1084
	2	1.22	20	24.39		
	3	6.67	18	120.10		
	4	48.85	16	781.61		
	5	103.05	14	1442.71		
	6	9761.97	12	117143.69		
Total		**9922.75**		**119532.12**		**1084**
2C3C7d	1	0.72	20	14.39	0.85	1051
	2	11.75	20	235.00		
	3	72.40	18	1303.23		
	4	292.41	16	4678.52		
	5	560.49	14	7846.82		
	6	6757.69	12	81092.26		
Total		**7695.45**		**95170.21**		**1051**
2C3C7f	1	0.05	20	1.06	0.85	1031
	2	2.62	20	52.35		
	3	15.54	18	279.67		
	4	90.72	16	1451.53		
	5	332.27	14	4651.75		
	6	8282.15	12	99385.79		
Total		**8723.35**		**105822.16**		**1031**
2C3C7g	1	0.46	20	9.15	0.85	1045
	2	6.58	20	131.64		
	3	42.69	18	768.45		
	4	146.72	16	2347.59		
	5	296.14	14	4145.98		
	6	4553.02	12	54636.18		
Total		**5045.61**		**62039.00**		**1045**
2C3C7h	1	3.24	20	64.77	0.8	984
	2	17.60	20	351.96		
	3	87.93	18	1582.76		
	4	304.05	16	4864.75		
	5	681.41	14	9539.68		
	6	9634.21	12	115610.57		
Total		**10728.43**		**132014.49**		**984**

2.5.5 Prioritization of Sub-Watersheds

The sub-watersheds are subsequently rated into various categories corresponding to their respective SYI values. The criteria followed for priority categorization of sub-watersheds depending upon their SYI values is given below and the priority classification of individual watershed is given in **Table 2.9** and **Figure 2.12.**

Priority categories	SYI Values
Very high	> 1300
High	1200-1299
Medium	1100-1199
Low	1000-1099
Very Low	<1000

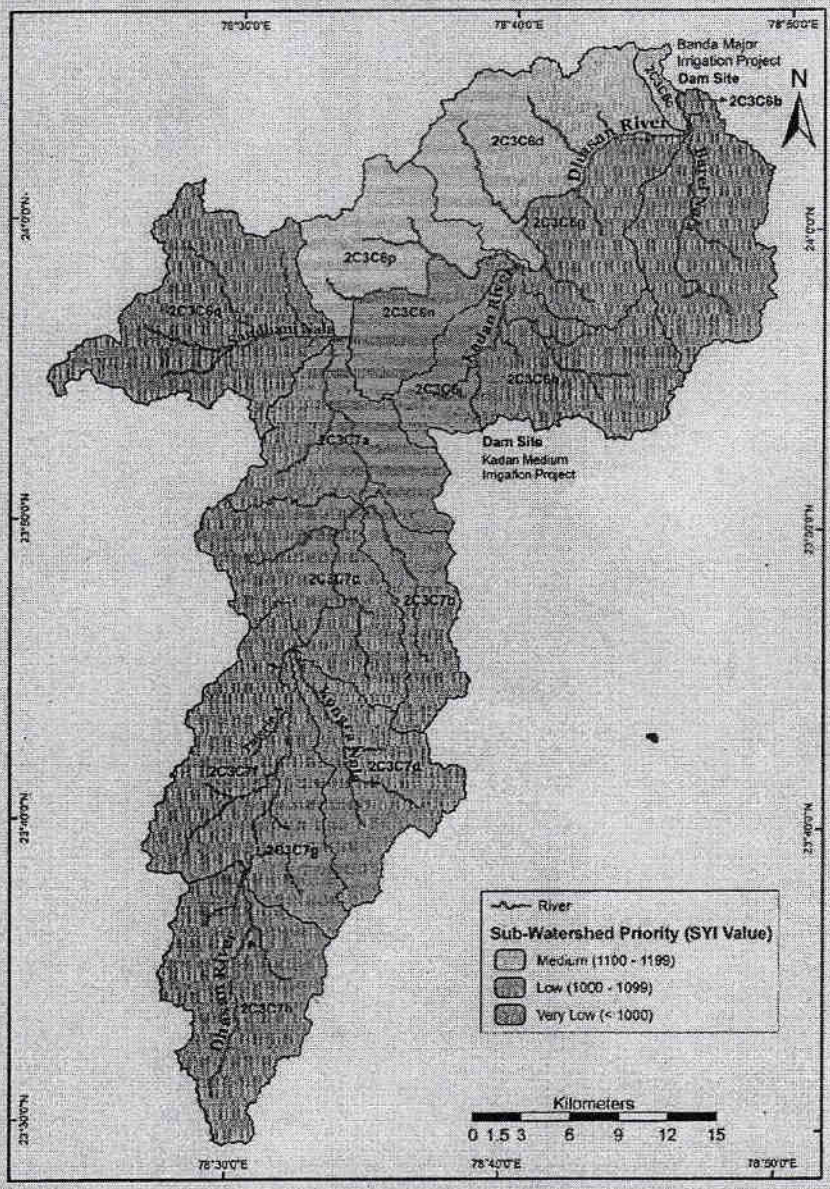

Figure 2.12: Sub-Watersheds Priority Classification Map of Free Draining Catchment Area

Table 2.9: Priority Number as per SYI Classification

S. No.	Sub-Watershed	SYI	Priority	Priority Number
1	2C3C6b	1082	Low	2
2	2C3C6c	1101	Medium	1
3	2C3C6d	1108	Medium	1
4	2C3C6f	1059	Low	2
5	2C3C6g	1098	Low	2

S. No.	Sub-Watershed	SYI	Priority	Priority Number
6	2C3C6h	1006	Low	2
7	2C3C6j	1032	Low	2
8	2C3C6n	1085	Low	2
9	2C3C6p	1110	Medium	1
10	2C3C6q	974	Very Low	3
11	2C3C7a	1085	Low	2
12	2C3C7b	1032	Low	2
13	2C3C7c	1084	Low	2
14	2C3C7d	1051	Low	2
15	2C3C7f	1031	Low	2
16	2C3C7g	1045	Low	2
17	2C3C7h	984	Very Low	3

2.6 TREATMENT PLAN

2.6.1 Area to be taken up for Treatment

Area under severe and very severe erosion intensity category in all the 17 sub-watersheds will be taken up for treatment. To arrive at such an area, area under severe and very severe erosion intensity category was extracted for each sub-watershed, which comes out to be **196.72 ha.** Thereafter, area considered as treatable area is **196.72 ha (or say 197 ha).** Out of the total 197 ha to be treated, it is proposed to treat **104 ha** by biological measures and the rest **95 ha** by engineering measures. Area proposed to be treated by biological measures will be well supported by proposed engineering measures.

The period for implementing CAT plan interventions including maintenance has been taken as 9 years. It is proposed to prepare micro plans for micro-watersheds, establish administrative setup and implement other entry point activities in the first year itself. It is proposed to implement treatment measures in sub-watersheds falling under medium priority in the second year itself, followed by implementation of treatment measures in sub-watershed falling under low priority in third year and sub-watershed falling under very low priority in fourth year. Maintenance period will be subsequent 5 years for afforestation as well as enrichment, whereas, maintenance period will be subsequent 3 years for energy plantation.

2.6.2 Treatment Measures

Watershed management is the optimal use of soil and water resources within a given geographical area so as to enable sustainable production. It implies changes in land use, vegetative cover, and other structural and non-structural action that are taken in a watershed to achieve specific watershed

management objectives. The overall objectives of watershed management programme are to:

- increase infiltration into soil;
- control excessive runoff;
- manage & utilize runoff for useful purpose.

The basis of site selection for different engineering treatment measures under CAT are given in **Table 2.10**.

Table 2.10: Basis for selection of catchment area treatment measures

Treatment measure	*Basis for selection*
Afforestation	Scrub forest land
Enrichment	Deciduous forest land
Energy Plantation	Scrub land and Fallow land
Brushwood Check Dams	Gullies formed around the streams
Dry Stone Masonry Check Dams	In the streams of 3rd and 4th order
Gabion Check Dams	Wherever loose boulders are not stable in particular stretch of a stream

APM

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बंडा सिंचाई परियोजना हेतु जल ग्रहण क्षेत्र (वन) की उपचार योजना के लिये व्यय का विस्तृत प्राक्कलन

वित्तीय वर्ष 2019– 20

1. वन भूमि – 34174.08 हेक्टेयर

कुल वन क्षेत्रफल –34174.08 हे.

प्रति 100 हेक्टेयर हेतु प्राक्कलित राशि

क्र.	कार्य का विवरण	कार्य की मात्रा		दर प्रति ईकाई (मा.दि.)		कुल मानव दिवस
		मात्रा	इकाई	मानव दिवस	इकाई	
1	सर्वे एवं सीमांकन हे0	100	ha	0.47	हे0	13912
2	अ. क्षतिग्रस्त मुनारों की मरम्मत	6	मुनारा	6.95	मुनारा	12343
3	अग्नि सुरक्षा कार्य					
	6 मीटर चौड़ी (6000 मीटर)	3.35		20	34	19832
	3 मीटर चौड़ी (15000 मीटर)	2.35		2.35	296	1635
4	(अ) जड भंडार विकास हेतु 20 से.मी. कम जीवित ठूठों विकुत वृक्षों की कटाई एवं सिंगलिंग	4		5.01 मा.दि.	20.04	5932
5	अभियांत्रिकीय कार्य					
	भू एवं जल संरक्षण कार्य					
	ए) चैक डेम संख्या ध.मी. में	500		1.26 मा.दि.	126	37296
6	सुरक्षा कार्य	2	श्रमिक	12 माह	720	213120
	योग					**304070**
7	समिति सशक्तीकरण हेतु किये जाने वाले कार्य				20%	60814
	महायोग (100 हेक्टेयर हेतु)					**364884**
	प्रति हेक्टेयर व्यय					**3648.84**
	34174 हेक्टेयर हेतु व्यय					**124695335**

(H. G. Kumhar)
Project Manager
Bina (P.M.U.) W.R. Department
Sagar (M.P.)

बंडा सिंचाई परियोजना हेतु जल ग्रहण क्षेत्र (गैर–वन) की उपचार योजना के लिये व्यय का विस्तृत प्राक्कलन

वित्तीय वर्ष 2019–20

1. राजस्व भूमि – 114898 हेक्टेयर

जल ग्रहण क्षेत्र (गैर–वन)

कुल क्षेत्रफल – 114898 हे. रोपण योग्य क्षेत्र 100 हे. मा. दि. 296 दर

प्रति 100 हेक्टेयर हेतु प्राक्कलित राशि

स.क्र.	कार्य का नाम	कार्य की मात्रा	वन संरक्षक द्वारा अनुमति दर	इकाई	कुल मानव दिवस	रिमार्क
1	2	3	4	5	6	7
1.	अ. सर्वे एवं सीमांकन हेक्टेयर	100	0.47	हेक्टेयर	47	13912
2.	अ. क्षतिग्रस्त मुनारों की मरम्मत	6	6.95 मा.दि.	प्रति नग	41.7	12343.2
3.	आंतरिक अग्नि सुरक्षा लाईन से निरीक्षण पथ निर्माण					
	(अ) जड भंडार विकास हेतु 20 से.मी. कम जीवित ठूठों विकुत वृक्षों की कटाई एवं सिंगलिंग	4	5.01 मा.दि.	हेक्टेयर	20.04	5931.84
4.	अभियांत्रिकीय कार्य					
	भू एवं जल संरक्षण कार्य					
	ए) चैक डेम संख्या घ.मी. में	100	1.26 मा.दि.	धन मी.	126	37296
	ब) कन्टूर बंडिंग (लंबाई)	400	0.1 मा. दि.	रनिंग मी	40	11840
5.	बीज बुबाई हेतु बीज संग्रहित कार्य	80	20	कि.ग्रा.	12.5	3700
6.	ग्राम वन समिति का निर्माण एवं संगठन		L.S.	L.S.	18.75	5550
	योग				305.99	**90573.04**
	प्रति हेक्टेयर व्यय					905.7304
	राशि प्रति 100 हेक्टेयर व्यय हेतु रूपये में					**90573.04**
	114898 हेक्टेयर हेतु कुल राशि रूपये में					**104066611**

APM

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Project Manager
Bina (P.M.U.) W.R. Department

वर्षवार किये जाने वाले कार्य का विवरण

क्र.	वर्ष	वन क्षेत्र में		गैर वन क्षेत्र में		महायोग
		रकबा	राशि	रकबा	राशि	
1	वर्ष 2022–23	8500	31015109	28700	25994462	57009571.88
2	वर्ष 2023–24	8500	31015109	28700	25994462	57009571.88
3	वर्ष 2024–25	8500	31015109	28700	25994462	57009571.88
4	वर्ष 2025–26	8674	31650007	28798	26083224	57733231
	योग	**34174**	**124695335**	**114898**	**104066611**	**228761947**

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