

EXECUTIVE SUMMARY

(English & Hindi)

OF

BANJAREWALA SAND MINING PROJECT

Village: Banjarewala,

Tehsil: Roorkee, District: Haridwar, State: Uttarakhand

Area: 51.02 Ha, Proposed Capacity: 3,94,000 TPA

APPLICANT

GARHWAL MANDAL VIKAS NIGAM LTD.

74/1 RAJPUR ROAD, DEHRADUN

Prepared By

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➤ **INTRODUCTION**

As per MoEF, New Delhi Gazette dated 14th September 2006 and amended thereof, the proposed mining project is categorized as **category 'A'** project. Also, there are following features present with in the 10 km study area.

- Rajaji National Park
- Interstate boundary between Uttar Pradesh and Uttarakhand.

The project is being proposed by Garhwal Mandal Vikas Nigam (GMVN) Limited. The proponent has applied for mining lease in the name of Banjarewala, Sand, *Bajri* & Boulder Mining Project from the bed of Mohan Rao River over an area of 51.02 ha.

It has been proposed to mine around 3, 49, 000 tonnes per annum of minerals. The estimated project cost for the proposed project is Rs.20.30 Lakhs.

➤ **LOCATION**

The proposed mining lease area falls in Survey of India Toposheet 53F16 (Site).

The lease area is located near Village: Banjarewala, Tehsil Roorkee, District: Haridwar, Uttarakhand.

The mine lease co-ordinates are listed below:

Latitude	30° 7'33.41"N to 30° 6'34.11"N
Longitude	77°52'14.51"E to 77°51'48.27" E

➤ **MINING**

This is an open-cast mining project. The operation will be entirely manual with use of hand tools like shovel, pan, sieves, pick axes, etc.

Mining will be done in layers, leaving a safety distance from the banks i.e. 15% of the width of the river will be left for bank stability from both the banks.

The deposit will be worked from the surface of the bed upto 1.5 m bgl or above ground water level, whichever comes first. Hence, at no point of time mining will intersect with ground water table.

Mining will be done only during the day time and completely stopped during the monsoon season.

RESERVE (AVAILABLE QUANTUM) AND PRODUCTION (EXTRACTABLE QUANTUM)

Reserve (Available Quantum)

The mineable area has been considered with an ultimate depth of 1.5 meter from the surface for calculation of the reserve. For the tonnage estimation the reserve quantity is multiplied with the bulk density of 2 tonnes per cum (for mixed sand and *bajri*).

As per the above calculation, it has been estimated that the reserve is 7,31,000 tonnes.

Production (Extractable Quantum):

Approx 3,94,000 tonnes will be excavated annually, of which sand & *bajri* is likely to be replenished gradually due to sediment inflow.

The extractable quantum in the first year would be limited to the available quantum.

➤ **SITE FACILITIES AND UTILITIES**

Water Supply

Water will be provided to workers for drinking & domestic purpose. Water will also be required for dust suppression. A total of 4.7 KLD water will be required for the proposed project.

Temporary Rest Shelter:

A temporary rest shelter will be provided for the workers near to the site for rest. In addition, First aid box along with anti-venoms to counteract poison produced by certain species of small insects, if any and Sanitation facility i.e. septic tank or community toilet facility will be provided for the workers.

➤ **BASE LINE DATA**

Environmental data has been collected in relation to proposed mining for Air, Noise, Water, Soil, Ecology and Biodiversity.

Baseline Environmental Status

Attribute	Baseline status
Ambient Air	Ambient Air Quality Monitoring reveals that the

Quality	minimum & maximum concentrations of PM ₁₀ amongst all the 5 AQ monitoring stations were found to be 44.20 µg /m ³ at AQ1 and 81.70 µg/m ³ at AQ3, respectively. As far as the gaseous pollutants SO ₂ and NO ₂ are concerned, the prescribed CPCB limit of 80 µg/m ³ for residential and rural areas has never been surpassed at any station.
Noise Levels	The results of the monitoring program indicated that both the daytime and night time levels of noise were well within the prescribed limits of NAAQS, at all the four locations monitored.
Water Quality	The ground water from all sources remains suitable for drinking purposes as all the constituents are within the limits prescribed by drinking water standards promulgated by IS: 10500. From surface water analysis results it is evident that most of the parameters of the samples comply with 'Category B' standards of CPCB, indicating Suitable for outdoor bathing.
Soil Quality	Samples collected from identified locations indicate the soil is sandy clay loam type and the pH value ranging from 6.54 to 7.85, which shows that the soil is slightly alkaline in nature.
Ecology and Biodiversity	Rajaji National Park is present within 10km radius of the study area. There are also 9 reserved forests in the study area i.e Thapal Dandi RF Budhban RF Kaluwala RF Mohan RF Sakrauda RF Dholkhand RF Chilawali RF Asarori RF and Asmaur RF.

ANTICIPATED IMPACTS AND MITIGATION MEASURES:

➤ LAND ENVIRONMENT:

Anticipated Impacts:

- Undercutting and collapse of river banks.
- Excessive and unscientific riverbed material mining is a threat to bridges, and nearby structures.
- River bank cutting and erosion.

- Upstream erosion as a result of an increase in channel slope and changes in flow velocity.
- Downstream erosion due to increased carrying capacity of the stream
- Downstream changes in patterns of deposition.
- Changes in river bed and habitat type.

Mitigation measures:

- Since the project is mainly for sand excavation (soil deficient), no loss of top soil is involved.
- The silt and clay generated as waste will be used for plantation or filling up low lying area elsewhere.
- Mine lease area has been proposed leaving a safety distance of 15% of the width of the river from the bank inwards which will protect the banks.
- In this activity, the work is proposed to be done manually which will avoid adverse effects associated with heavy machinery and their functioning.
- The mining is planned in non monsoon seasons only, so that the excavated area gets replenished during the monsoon each year.
- Grasses and bushes which have fibrous roots at the first instance are proposed to grown along the banks which enhances the binding properties of the soil. Hence protecting the banks.
- The systematic and scientific removal of sand will not cause bed degradation.
- Restoration of bank will be ensured at the end of mine closure every year.

➤ **WATER ENVIRONMENT:**

Anticipated Impacts:

Mining of sand from within or near a river bed has a direct impact on the physico-chemical habitat characteristics. These characteristics include in stream roughness elements, depth, velocity, turbidity, sediment transport and stream discharge. Altering these habitat characteristics can have deleterious impacts on both in-stream biota and associated riparian habitat.

The detrimental effects, if any, to biota resulting from bed material mining are caused by following:

- i. Alteration of flow patterns resulting from modification of the river bed
- ii. An excess of suspended sediment

iii. Damage to riparian vegetation and in-stream habitat

The disturbance activities can also disrupt the ecological diversity in many ways.

Mitigation measures

Project activity will be carried out in the dry river bed, as it is a season river. Hence, none of the project activities affect the water environment directly. In the project, it is not proposed to divert or truncate any stream. No proposal is envisaged for pumping of water either from the river or tapping the ground water.

The deposit will be worked from the top surface up to a maximum depth of 1.5m below ground level or above the ground water table whichever comes first. Hence mining will not affect the ground water regime as well.

Further mining will be completely stopped during the monsoon seasons, only season when the river flows, to allow the excavated area to regain its natural profile.

➤ **AIR ENVIRONMENT:**

Anticipated Impacts:

Emission of fugitive dust is envisaged due to:

- i. Mining Activities includes excavation and lifting of minerals. The whole process will be done manually. Therefore the dust generated is likely to be insignificant as compared to mining processes involving drilling, blasting, mechanized loading etc.
- ii. Transportation of minerals will be done by road using trucks. Fugitive dust emission is expected from the transportation of trucks on the haul roads.

Mitigation measures

The collection and lifting of minerals will be done manually. Therefore the dust generated is likely to be insignificant as there will be no drilling &

blasting. The only air pollution sources are the road transport network of the trucks. The mitigation measures like the following will be resorted:

- iii. Water sprinkling will be done on the haul roads twice in a day. This will reduce dust emission further by 74% (*Ref. Haul road dust control by WR REED & JA Organiscak*).
- iv. Speed limits will be enforced to reduce airborne fugitive dust from vehicular traffic.
- v. Spillage from the trucks will be prevented by covering tarpaulin over the trucks.
- vi. Deploying PUC certified vehicles to reduce their emissions.
- vii. Proper tuning of vehicles to keep the gas emissions under check.
- viii. Monitoring to ensure compliance with emission limits would be carried out during operation.

➤ **NOISE:**

Anticipated Impacts:

- Mental disturbance, stress & impaired hearing.
- Decrease in speech reception & communication.
- Distraction and diminished concentration affecting job performance efficiency

Mitigation measures

The following measures have been envisaged to reduce the impact from the transportation of minerals:

- i. The vehicles will be maintained in good running condition so that noise will be reduced to minimum possible level.
- ii. In addition, truck drivers will be instructed to make minimum use of horns in the village area and sensitive zones.
- iii. No such machinery is used for mining which will create noise to have ill effects.
- iv. Awareness will be imparted to the workers about the permissible noise levels & maximum exposure to those levels.

➤ **BIOLOGICAL ENVIRONMENT:**

Anticipated Impacts:

- Excessive and unscientific riverbed sand mining results in the destruction of aquatic and riparian habitat through large changes in the channel morphology.
- Access roads crossing the riparian areas will have impact on the species disturbing the ecosystem.
- Mining may drive away the wild life from their habitat, and significantly affect wildlife and nearby residents.
- Diminution of the quality and quantity of habitat essential for aquatic and riparian species.
- Reduction in the yield of agriculture due to deposition of dust on the leaves, etc. of the crops.
- Fragmentation of wildlife habitat and blocking of migratory paths/corridors. Isolation may lead to local decline of species, or genetic.
- Mining on the streambed, braided flow or subsurface inter-sand flow may hinder the movement of fishes between pools.

Mitigation measures

As the proposed mining will be carried out in a scientific manner, not much significant impact is anticipated, however, the following mitigation measures will be taken to further minimize it:

1. No mining will be carried out during the monsoon season to minimize impact on aquatic life which is mainly breeding season for many of the species.
2. As the mining site has no vegetation, no clearance of vegetation will be done.
3. Prior to closure of mining operations / during the rainy season the eroded bank will be restored / reclaimed to minimize negative impacts on aquatic habitats.
4. Haul roads will be sprinkled with water which would reduce the dust emission, thus avoiding damage to the crops.
5. Mining will be carried out on the dry part of the lease area to avoid disturbance to the aquatic habitat and movement of fish species.
6. No discard of food, polythene waste etc will be allowed in the lease area which would distract/attract the wildlife.
7. No night time mining will be allowed which may catch the attention of wild life.
8. If wildlife are noticed crossing the area, they will not be disturbed at all.

9. Workers will be made aware of the importance of the wildlife and signage will be displayed at the sensitive areas to caution the workers & other passerby.
10. Access roads will not encroach into the riparian zones and if any riparian vegetation cleared off for the mining activity will be restored at the end of closure of mine.

➤ **ENVIRONMENTAL MANAGEMENT PLAN (EMP) & ITS IMPLEMENTATION**

- Extraction will be done from the river bed leaving safety zone from bank.
- The maximum working depth will remain above ground water table of the area.
- Provide health facilities to the workers & surrounding people in the impact area to reduce the health impacts.
- Ensuring wildlife protection & arranging awareness campaigns for the same.
- Minimize activities that release fine sediment to the river.
- Check on traffic load due to transportation & maintenance of evacuation route.
- Effective mitigation measures will be adopted to minimize disturbance during transportation & handling of minerals:
- Establishment of reclamation program with plantation of local/native & fast growing species
- Establishment of restoration plan during the closure of mine at the onset of monsoon season.
- Establishment of effective Disaster Management Plan to take timely precautionary measures to avoid effects of impending disasters.
- Establishment of effective Monitoring Program monitored by Environment Management Cell.

➤ **BUDGET ALLOCATION FOR EMP IMPLEMENTATION**

Sl. No	Description	Measures	Capital Cost (Rs. In	Recurring Cost(in
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			lakhs)	lakhs/annum)
1	Health Facilities	Medical Camps and Awareness program	1.0	1.3
2	Wildlife Protection	• Importance of Wildlife(Awareness)	-	0.1
		• Sign boards, information boards	0.5	0.1
3	Mineral transportation and Handling	• Repairing and maintenance of Roads	1.0	1.8
		• Water Sprinkling	1.0	2.4
4	Restoration and Reclamation	• Plantation	1.0	0.36
		• Maintenance of flood embankments	-	0.5
		• Restoration of banks	-	1.2
Total			4.50	7.76

➤ **BENEFITS OF MINING**

➤ **PHYSICAL BENIFITS**

The opening of the proposed project will enhance the following physical infrastructure facilities in the adjoining areas.

- a. **Improvement in Road Transport/**road communication due to the proposed project and maintenance will also be done time to time.
- b. **Market:** Generating useful economic resource for construction. Excavated mineral will provide a good market opportunity.
- c. **Enhancement of green cover:** As a part of reclamation plan, plantation will be carried along the river banks or along the road sides or near the civic amenities.
- a. **Creation of community assets** (infrastructure) like provision for drinking water, construction of school buildings, village roads/ linked roads, dispensary & health centre, community centre, market place etc, as a part of corporate social responsibility.

➤ **SOCIAL BENEFITS**

- a) **Increase in Employment** Potential due to the project activity. Employment opportunities will increase both directly as well indirectly.
- b) **Contribution to the Exchequer** as the saleable minerals will be given royalty. Since the quarries will be leased out to successful allottees, mining operation in the state will get legalized and it will fetch income to the state exchequer.
- c) **Increased Health related activities:** Healthcare promotional activities will be undertaken. Pre-placement & and Periodic medical checkups will be done, which will lift the general health status of the residents of the area. Health camps, medical aids, family welfare programs, immunization camp sports will be arranged.
- d) **Educational attainments:** Educational activities will be promoted by the lessee. Awareness program will be arranged covering basic issues related to primary level education, environment, health and hygiene etc.
- e) **Strengthening of existing community** facilities through the Community Development Programme.

➤ **ENVIRONMENTAL BENEFITS**

- a. Controlling river channel
- b. Protecting of river banks
- c. Reducing submergence of adjoining agricultural lands due to flooding.
- d. Reducing aggradation of river level.
- e. Protection of crops being cultivated along the river bank.
- f. A check on illegal mining activity.

➤ **CORPORATE SOCIAL RESPONSIBILITY**

A percentage of the project cost will be allotted for the Corporate Social Responsibility for activities related to education, social causes, healthcare & environmental.

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[kuu 1-5 ehVj dh xgjkBZ rd ;k Hkwty ds Åij rd fd;k tk,xk blfy, [kuu
dk Hkwty iz.kkyh ij Hkh dksbZ izfrdwy izHkko ugha iM+sxA
;gh ugha] [kuu dk;Z ekulwu ds nkSjku can dj fn;k tk,xk rkfd [kfur
{ks= izk—frd :i ls iquHkZj.k gks ldsA

➤ **ok;q i;kZoj.k %**

iwokZuqekfur izHkko %

d- [kuu dk;ks± esa [kfutksa dk [kuu ,oa <qykbZ 'kkfey gSaA
laiw.kZ izfØ;k gLrpkfyr gksxhA blfy, [kuu ds fM^afyax] foLQksV]
e'khuh <qykbZ vkfn tSlS dk;ks± dh rgyuk esa èkwy de iSnk
gksxhA

[k- [kfutksa dh <qykbZ iM+d ekxZ ls V^adksa ls fd;k tk,xkA
igqap ekxZ ij V^adksa dh vkoktkgh ls mM+us okyh èkwy dk
mRItZu gks ldrk gSA

'keu ds mik;

[kfutksa dk laxzg vkSj <qykbZ dk dk;Z gLrpkfyr gksxhA blesa
fM^afyax ;k foLQksV dk lgkjk ugha fy;k tk,xk blhfy, V^adksa dk

vkoxeu] ok;q iznw" k.k dk ,dek= lzksr gksxkA "keu ds fuEufyf[kr
mik; viuk, tk,axs %

d- igqap ekxks± ij fnu esa nks ckj ikuh dk fNM+dko fd;k tk,xkA
blls èkwy ds mRltZu esa 74 izfr'kr vkSj deh gksxh $\frac{1}{4}$ lan-
MCY;wvkj jhM o ts, vkWxSZfuLdSd dk gkWy jksM MLV
daV^aksy $\frac{1}{2}$ A

[k- okguksa dh vkoktkgh ls mM+us okyh èkwy esa deh ykus ds
eísutj xfr lhek,a ykxw dh tk,axhA

x- V^adksa ij frjiky Mky dj V^adksa ls gksus okys Nydko dh
jksdFkke dh tk,xhA

?k- mRltZu dks de djus ds fy, ih;wlh (PUC) ds izek.ki= izklr okgu
pyk, tk,axsA

p- xSl mRltZu dks fu;af=r j[kus ds fy, okguksa dh leqfpr V~;wfuax
dh O;oLFkkA

N- dk;Z ds nkSjku mRltZu lhek dk vuqikyu lqfuf'pr djus ds fy,
fuxjkuh O;oLFkkA

➤ **èofu %**

vuqekfur izHkko %

- ekufld v'kkafr] ruko vkSj Jo.k 'kfDr dh {kh.krkA
- cksyus vkSj ckrphr djus dh 'kfDr esa dehA
- ,dkxzrk Hkax vkSj de gksuk & QyLo:i dk;Z fu"iknu {kerk
izHkkfor

'keu ds mik;

[kfutksa dh <qykbZ ls mRiUu izHkkoksa esa deh ds fy, fuEufyf[kr
mik;ksa ij fopkj fd;k x;k gS %

d- okguksa dk vPNh pkyw gkyr esa j[kj[kko fd;k tk,xk rkfd èofu
;FkklaHko U;wure Lrj rd de dh tk ldsA

[k- blds vfrfjDr] V^ad pkydksa dks xkao ds lkFk&lkFk laosnu'khy
{ks=ksa esa Hkksai dk mi;ksx de ls de djus dk funsZ'k fn;k tk,xkA
x- [kuu dk;Z esa ,slh fdlh Hkh e'khu dk mi;ksx ugha fd;k tk,xk ftlls
izHkko Mkyus okyh èofu mRiUu gksA

?k- Jfedksa dks èofu ds fuèkkZfjr Lrjksa vkSj mu Lrjksa dk vfèkd
ls vfèkd ikyu djus ds izfr tkx:d fd;k tk,xkA

➤ **tSfod i;kZoj.k %**

iwokZuqekfur izHkko %

- unh ds ry ls jsr ds vfr vkSj voSKkfud [kuu ds QyLo:i ty izokg
dh vk—fr esa ifjorZu ds dkj.k tyh; vkSj rVorhZ izk—frd vkokl
dk uk'k gksrk gSA
- rVorhZ {ks=ksa ls gks dj xqtjus okys igqap ekxks± dk
isM+&ikSèkksa vkfn ij izHkko iM+sxk ftlls i;kZoj.k iz.kkyh
vlqarfyr gksxhA
- [kuu ds dkj.k oU; tho vius vkokl {ks= ls nwj tk ldrs gSa] ftldk
izHkko oU;thou ,oa lehi esa jgus okys yksxksa ij iM+sxkA
- tyh; ,oa rVorhZ thotxr ds fy, vko';d izk—frd vkokl dh xq.koÙkk
vkSj ek=k esa dehA
- Qlyksa ds iÙkksa vkfn ij èkwy teus ds pyrs [ksrh dh mit esa
deh A

- oU;tho ds izk—frd vkokl dk {kj.k vkSj izokl ikFkksa@xfy;kjksa dk vo#) gksukA foyxko ds QyLo:i LFkkuh; iztkfr;ksa ;k mRifÙk esa deh gks ldrh gSA
- èkkjk ry] iV~Vh izokg ¼cZsMsM ¶lyks½ ;k lrg dh jsr ¼baVj&ISaM½ ds [kuu ls tyk'k;ksa esa eNfy;ksa dh xfrfofèk ckfèkr gks ldrh gSA

'keu ds mik;

izLrkfor [kuu dk;Z oSKkfud <ax ls fd;k tk,xk] blfy, xaHkhj izHkko dh laHkkouk ugha gS] fdarq] bldss izHkko vkSj de djus ds fy, fuEufyf[kr mik; fd, tk,axs %

d- tyh; thoksa ij iM+us okys izHkko dks de djus ds fy, ekulwu ds ekSle nkSjku] tks dbZ thoksa ds tuu dk ekSle gksrk gS] dksbZ [kuu dk;Z ugha fd;k tk,xkA

[k- [kuu LFky ij dksbZ ouLifr ugha gS] blfy, ouLifr dh IQkbZ ugha dh tk,xhA

x- igqpa ekxks± ij ikuh dk fNM+dko fd;k tk,xk ftlls èkwy mRltZu esa deh vkSj Qlyksa ds uqdlku dh jksdFkke gksxhA

?k- tyh; thoksa ds izk—frd vkokl vkSj eNfy;ksa dh xfrfofèk dks ckfèkr gksus ls cpkus ds eísutj [kuu dk;Z iV~Vk {ks= ds dsoy lw[ks {ks= ij fd;k tk,xkA

p- Hkkstu ds twBu] ikWfyFkhu ds dwM+s ds izfr oU;thoksa esa vkd"K.k gks ldrk gS] blfy, iV~Vk {ks= esa ,sls inkFkZ Qsadus dh vuqefr ugha gksxhA

N- ;fn oU;tho {ks= ls xqtjrs ns[ks tk,a] rks mUgSa fdlh Hkh rjg ls ckèkk ugha igqapkbZ tk,xhA

t- Jfedksa dks oU;thoksa ds izfr tkx:d fd;k tk,xk vkSj Jfedksa rFkk vU; vkus&tkus okys ykxksa dks lpsr djus ds fy, laosnu'khy {ks=ksa ij ladsr yxk, tk,axsA

>-- igqap ekxZ rVorhZ {ks=ksa dk vfrØe.k ugha djsaxs vkSj [kuu dk;Z ds fy, ;fn dksbZ ouLifr dkVh tkrh gS rks [kuu dk;Z iwjk gks tkus ij iqu% o`{kkjksi.k fd;k tk,xkA

➤ **i;kZoj.k izcaèku ;kstuk ¼b,eih½ ,oa mldk dk;kZUo;u**

- rV vkSj èkkjk ls lqjf{kr {ks= NksM+rs gq, unh ry ls [kfut inkFkZ laxzg fd;k tk,xkA
- dk;Z dh vfèkdre xgjkBZ {ks= ds Hkwty Lrj ds Åij jgsxhA
- LokLF; ij iM+us okys izHkkoksa dks de djus ds fy, izHkko {ks= esa Jfedksa vkSj vklikl ds ykxksa dks LokLF; lqfoèkk,a eqgS;k djkbZ tk,axhA
- oU;tho laj{k.k lqfuf'pr dh tk,xh vkSj blds fy, tkx:drk vfHk;ku pyk, tk,axsA
- ,slh xfrfofèk;ka de dh tk,axh ftuds QyLo:i lw{e ryNV unh esa igqap ldsA
- <qykbZ vkSj fudkl ekxZ ds j[kj[kko ds pyrs ifjogu ij iM+us okys Hkkj ij fu;a=.k j[kk tk,xkA
- ifjogu vkSj [kfut inkFkks± ds j[kj[kko ds nkSjku mRiUu gksus okyh xM+cM+h dks de djus ds fy, U;wuhdj.k ds izHkko'kkyh mik; viuk, tk,axs %
- LFkkuh;@ewy ,oa rsth ls c<+us okys thoksa ds fy, lqèkkj dk;ZØe dk lapkyuA

- ekulwu _rq ds vkus ds le; [kuu ds canh ds nkSjku uohuhdj.k ;kstuk dk fØ;kUo;uA
- laHkkfor vkinkvksa ls cpus ds fy, le; ij ,gfr;krh mik; viukus gsrq izHkko'kkyh vkink izcaèku ;kstuk dk fØ;kUo;uA
- i;kZoj.k izcaèku izdks"B }kjk izHkko'kkyh fuxjkuh dk;ZØe dk fØ;kUo;uA

bZ-,e-ih- dss fy, ctV vkoaVu

Øe la	fooj.k	mik;	lkwathxr Ykkxr ewY; :- yk[kksa esa	vkoZrh ewY; #- Ykk[kksa esa@lkykuk
1	LokLF; lqfo/kk	esfMdy dSEi vkSj tkx#drk izksxzke	1.0	1.3
2-	ou thoksa dk laj{k.k [kfut dk j[k[kko vkSj lapkyu	& OkU; thoksa dk egRo ¼tkx:drk½ & lkbv cksMZ lwpuk cksMZ	- 0.5	0.1 0.1
3-	[kfut dk j[k[kko vkSj lapkyu	& IM+dksa dh ejEer vkSj j[kj[kko & ty fNM+dko	1.0 1.0	1.8 2.4
4-	iqokZoLFkk dh izzkflr	& o`{kkjksi.k & ck/kkas dh ckf/kr nhokj dk j[k j[kko & fdukjksa ds ejEer	1.0 - -	0.36 0.5 1.2

		dk;Z		
dqy			4.50	7.76

➤ **[kuu ds YkkHk**

HkkSfrd ykHk

izLRkkfor ifj;kstuk ds izkjaHk gksus ls vklikl ds fuEufyf[kr {ks=ksa esa HkkSfrd cqfu;knh <kaps dks c<kok feysxA

d- IM+d ifjogu ;k IM+dksa laidZ esa o`f)

[k- [kfut ls vPNs cktk+jh volj feysaxsA

Xk- gfj;kyh /o` {kkjksi.k dks c<kok

?k- leqnkf;d ifjlaifÙk;ksa dk l`tu ¼cqfu;knh <kaps½

Lkkekftd ykHk%

d½ jkstxkj esa o`f)

[k½ jktdks`k esa va“knku ¼[kfut fd fcØh ls jktLo izklr gksxk½

]Xk½ LokLF; lacaf/k xrfof/k;k dks c<kok

?k½ “kSf{k d xrfof/k;ka cukus vkSj mudks c<+kok nsus dh ;kstukA

M-½ rRdkyhu leqnk; dk lqn`<+hdj.k lkeqnkf;d fodk; dk;ZØe ds ek;/e ls lqfo/kk dk;ZØeA

i;kZoj.kh; ykHk%

d½ ufn;ksa dh /kkjvkksa ij fu;a=.kA

[k^{1/2} ufn;ksa ds fdukjksa dh lqj{kkA

Xk^{1/2} ck< ds dkj.k vkl&ikl ds {ks=kas ds d`f`k Hkwfe dks de ls de
tyeXu gksus ls cpkukA

?k^{1/2} unhs Lrj ds mPp;u dks de djukA

aM^{+1/2} unh ds fdukjksa ds vkl ikI ij mxh Qlyksa dh lqj{kkA

p^{1/2} voS/k [kuu jksdus ds mik;A

➤ **fuxfer (dkiksZjsV) lkekftd nkf;Ro**

fuxfer (dkiksZjsV) lekftd nkf;Ro xfrfof/k;ksa ds fy, ifj;kstuk ykxr
dk va”k vkoafVr fd;k tk,xk] TkSlS f”k{kk] lkekftd dkj.k] LOkkLF;
,oa i;kZoj.k ns[kHkkyA
