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MADRAS RECORD OFFICE

Government of Madras

Public Works

DEPARTMENT

G.O. No.	2697	Press
B.P. No.		Mis.
Dated	6-10-	1876
		195

Not to be folded or roughly handled

Note by the Chief Engineer for Irrigation

Encl. 10

In P.M.G. of the 26th July last N° 1901 certain papers showing the irrigation in the Godavery Delta in 1874-75 and also in 1873-74 were recorded pending the submission of explanations regarding decrease of area irrigated, and revenue which had been called for by this office from the District Engineer.

2. The Executive Engineer in charge of the District has transmitted in reply to the reference from this office a report on the subject, which conveys also his views as officer in charge of the Eastern Delta together with reports from the officers in charge of the Central and Western Deltas.

Printed in P.M.G.
N° 1901

3. In this office memo N° 64 G.D. certain discrepancies in the Western Delta under

1. Areas of villages

2. ultimate area of irrigation.

were noticed. The Range officer explains that the village Karmungiro annually the ayacuts of their villages and the total of these very often differs from that of former years. The areas of villages have nothing to do with the ayacut, and are invariable unless the village boundaries are altered. Care should be taken to make these and all other standard entries accurately.

4. With regard to the marked decrease of area of irrigation and revenue in the Eastern Delta, Lt. McNeil Campbell has gone carefully into the subject and into the causes of the decrease, and though it would have been preferable had he retained the papers for review by Major Beatty, whose acquaintance with the Delta is much more extended, his remarks deserve consideration. In para 7 he mentions 8 causes or reasons for

a decline in the extent of irrigation in this delta.

1st Reason.

5. Water being supplied late in the season. This he considers to be the chief cause. This late supply has been occasioned, at any rate principally, by the improvements in progress, but it is doubtful whether this reason should justify the postponement of the commencement of the season's cultivation. However that may be the works have been so far completed as to render any inconvenience on this account unnecessary in the future, and the canals should all be open for irrigation by the 1st June at latest, and earlier should the freshes in the river render irrigation practicable. Statement A gives the date of opening of the several canals of this delta from 1871 to 1875 inclusive.

2^d Reason.

6. Para 1 of Rule II of Revenue Circular No. 5. Lt. Campbell notices that the effect of this rule is to give

the ryots the advantage of well
manured (by silt) lands for dry
crops, while paying only for land
the assessment (dry) on which was
fixed without reference to this
advantage. Also that dry paddy
is successfully cultivated within a
short distance of the canals when
but for these it could not be culti-
vated. It is however doubtful whether
this species of cultivation will be other
than exceptional, for it would not in
general pay a ryot to cultivate in-
ferior paddy in order to avoid the
water tax. The point is however one
which should receive attention in
order that the extent so cultivated
from year to year may be ascertained.

7 Preference of ryots for dry
crops. There is no doubt that much
of the land especially in the higher
parts of the delta is better fitted for
dry than for wet cultivation, and it
is certain that under the particular
circumstances lands well adapted for

3^d reason

3
• either kind of cultivation are more
remunerative when dry cropped than
when irrigated because the canals
and the neighbouring wet cultivation
produce sufficient moisture to make
successful dry cultivation almost a
certainty, and an acre of thoroughly
well grown cholam is more profitable
than the same area of excellent paddy.
It is certainly desirable that there
should be a variety of crops in every
considerable area or tract of country,
and it is not therefore to be wished
for ~~that~~ that the delta should be
entirely or nearly wholly irrigated,
but at present the irrigated area is
rather less than one half of the total
area, and it exceeded one half only
in one year - 1871-72 - and then only
very slightly, so that there is clearly
room for more irrigation without
unduly curtailng the extent of dry
crops. Moreover it is not pro-
bable that very much land hitherto
successfully irrigated will be per-

manently need for dry crops. The
ruling prices of any particular
time for paddy and other grains
or seeds respectively will exert an
influence and when dry grains
and seeds are in demand such land
as is well suited to their production
will be so cultivated in preference
to paddy. This need not be a matter
of regret, though it may affect more
or less the apparent benefit as ex-
hibited in the Revenue of accounts,
resulting from outlay on irrigation
works. With regard to the Bank
Canal it will be seen that St. Campbell
is of opinion that the prospects of
extended irrigation are not good.
Similar views were held by the late
Mr. Sage when in charge of this delta,
and a consideration of the circum-
stances induced the undersigned to think
that the canal should be designed for
a considerably less acreage than had
been intended, but the then District Engineer
was strongly in favour of providing

Para 2 of Report of
Inspection in P.N.B.
1874 of 18 April
1871

* Para 5 of letter

St. 1168 of 10 March 1873
Para 3 of letter St. 2650
23 December 1873.

+ printed in P.N.B.

St. 664 of 12 March

1874.

4th Reason

70 4
water for the larger area, and the
revised estimates which were approved
in the order marginally noted were
prepared accordingly.

Improved Drainage. The ex-
tensive drainage ^{works} have very probably,
as St. Campbell supposes, ~~been~~ rendered
lands fit for dry crops which before
could be cultivated only wet. It may
be possible in due course to show
how far this has been the case.
With regard to this officer's remark
on the dimensions of drains it is
to be noticed that their present
dimensions are tentative, and the
rainfall has of late years been
light. When the results of a really
heavy rainfall have been ascertained,
recorded and reviewed, it will be
practicable to come to a settlement
of their ultimate dimensions. The data
available when some plan had to
be adapted for the preparation of
the estimates were extremely limited

and for reliable data the observations
of many years are required. The
question of the incidence of charge
for drainage works is one out of
many which has to be considered.

The progress of the works
provided for in the completion, etc.
to water. To this cause St. Campbell
attributes a not inconsiderable effect.
Some inconvenience must have
been unavoidable but, unless the
systems of the Eastern Delta differ
essentially from those of the western
Delta, only actual rather than
possible inconvenience would have
been substituted a decrease for an in-
crease of irrigated cultivation. Any
doubt about water supply must
moreover long since have vanished.

10. New side channels. St.
Campbell attributes much influence
upon the area of irrigation to the
introduction or construction of
side channels where they did not

5
formerly exist. He has mixed up
two entirely distinct subjects in
this supposed cause of diminished
extent of irrigation viz:

1st the distribution of water by
numerous or few offtakes from
principal canals.

2nd the relative efficiency of side
channels or channels parallel
to the canals on the one hand,
and diverging channels on the
other hand.

St. Campbell plainly and strongly
advocates the adoption of a
system of numerous distribution
channels; and in fact the retention
of the old system of allowing any
number of offtakes from canals,
the only change being the construction
of masonry sluices or iron pipes
for their regulation in supersession
of the palmyna spouts or other
temporary and dangerous means
of drawing off water, which existed

on the former unimproved canals.

(H) The objections to numerous offtakes and to the provision of separate distributaries from canals for small areas are essential and radical.

1st They cause great waste of water, and complicate drainage arrangements. Were the head of water available for the supply of distributaries constant, and were the quantity of water required for a given small area of irrigation invariable or very slightly variable, the objection to numerous offtakes on the ground of waste would be obviated, but small areas require at times a quantity of water greatly in excess of the average supply necessary and the sluices supplying distributaries must be arranged to afford the maximum. It is impracticable to arrange for the regulation at short intervals

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of the supply from hundreds of sluices by means of canal establishments, and ryots find it easier to let water run on to and off their fields when there is surplus than to go to the head sluice and regulate the water according to their requirements. There is abundant experience to show that, with multiplied offtakes from principal canals, the total water supply has to be far in excess of the quantity otherwise necessary and the consensus of opinion and the uniformity of practice not only in this Presidency but under the great irrigation works of the N. W. Provinces is remarkable. Engineers, if not everywhere at any rate in widely separated Provinces, have arrived at the conclusion that economy of water distribution is unattainable with numerous offtakes from principal canals.

2nd Numerous offtakes are costly. A

sluice in the bank of a canal costs very nearly as much if it be to supply 100 as for 3 or 4 thousand acres, and similarly the cost of channels is far from being in proportion to the acreage for which water may be carried.

(2) Lt. Campbell's experience has until within the last few months been confined to the Kistna Delta where, from the many imperfections of the canals and distributaries, the waste of water is very great and were such waste not to be, as it will be in due course, obviated, it would be impossible to irrigate anything approaching to the ultimate area intended to be supplied.

(3) Side or parallel channels may or may not be in particular cases the proper alignment of distributaries. This must depend upon the circumstances. The most economical arrangement

as regards cost of construction is to carry a distributary by the most direct route to the point at which it will be in cutting equal to from $\frac{1}{3}$ to $\frac{2}{3}$ the depth of water to be carried, and thence along a line which will keep it in such cutting as nearly as may be conveniently practicable. On the other hand questions of land compensation, of avoidance of cultivation, of separation of irrigated land from existing sources of supply, and many other matters affect the determination of the best line for a distributary.

(4) Lt. Campbell's remarks on the irregular practices in the way of placing bunds or dams across them and cutting their banks, which practices he avers cannot be stopped owing to the difficulty of detecting their perpetrators, point to the absence of a proper system of minor distribution.

which defect should be attended to at once. Such practices will be rare if not unknown when all excuse for them is removed. What is necessary is to determine the proper place for the head of each minor distributary whether each channel has to be constructed and maintained by Government or by the ryot. This is a matter of levels and with them is of easy determination. With minor channel heads in their proper places, all necessity for dams across the channel of supply at once is obviated, and the regulation of the heads of minor channels should be effected by appropriate sluices which, at least for field channels, may be of the simplest construction viz a floor and side walls with grooves in the latter for a plank. Ryots if left to themselves naturally endeavour to obtain a supply for their fields

Vide para 52 of
Notes of Inspection
in P.W.D. 29th Sept.
1874, No 2732.

Impr.

from the point on a channel nearest to their lands, and frequently the levels will not admit of a supply being thence obtained without a dam. A very remarkable instance of inefficient secondary distribution was exhibited in the case of the side channels or, as they are really, canals of irrigation of the Strama-patam canal, western Betta, Kistna, and there the want of a proper knowledge of what was necessary led to the construction of dams across these canals to supply improperly located offtakes instead of placing the heads of the latter in their proper position thus undoing much of the benefit intended to be secured by the construction of these canals at a very considerable cost.

[5] Lt. Campbell's ideas as to the superior efficiency of distributaries having their heads immediately

above locks are based upon a
misapprehension. The head of
an irrigation channel should be
placed where the levels afford a
sufficient command, and as
near to the land to be irrigated
as may be, consistently with securing
this command. As also the remarks
about loss of head in distributaries
are, at any rate as stated, erroneous.
Irrigation water should be carried
at a level which will conveniently
command all the land to be
irrigated. If it do this it is im-
material at how much below
the level of the water of the canal
of supply the distribution water
is conveyed.

16/ Here the general system of
distribution in the Eastern Delta
at fault, the similar system in the
Western Delta would necessarily
produce like results. There however
instead of decrease of area of

170 9
irrigation there has been a steady
and marked increase of area
irrigated. What is in fault is no
doubt a defective system of minor
distribution and to this the Range
officer should give early and
careful attention. The ryots want
only efficient arrangements which
must be laid out for them in
detail. They may have suffered
inconvenience from the new arrange-
ments, and if so it is because
these have stopped short of what
is essentially necessary to their
efficiency.

17/ Every area of land whether
great or small for which it may
be determined to afford means of
irrigation must be effectively supplied.
There are some small areas near
canals which have been irrigated,
but which it may not be desirable
to continue to irrigate because they
can be supplied only at the expense

of the efficiency of supply
of much larger areas. The new
channels under the Samulcotta
canal are not intended for the
supply of the strip of land
close and parallel thereto, but
for the considerable areas to
the south which they will effectively
command. The intention is on
record. The land close to the
canal may be separately provided
for by direct irrigation from the
canal whenever its extent is suf-
ficient to justify the expense of
putting sluices into the canal
bank; otherwise it should not,
or should cease to, be irrigated.
There are several cases in which
lands are too high to be effectively
and economically irrigated from
canals from which they have been
in the past supplied; they were so
irrigated formerly because the
demand for water was less and

the arrangements which were then
not injurious to the bulk of the
irrigation are now no longer per-
missible. With care and proper
investigation all the land which is
at a suitable level can and should
be effectively supplied under arrange-
ments which will reduce waste to
a minimum, allow of adequate
supervision and regulation, and ob-
viate recourse on the part of the
ryots to irregular practices of
whatever kind. There is plenty
of land so situated to absorb
all the water provided by the
canals and in the Eastern Delta
the results may be made as satis-
factory as they are in the Western
Delta. The management of a Delta
Range is no light task, but there is
much help to be obtained from past
experience, and had the District
Engineer been at hand to correct St.
Campbell's opinions no doubt a good

And...
...
...

many of the errors into which he has fallen would have been prevented.

11 The selling price of paddy ^{7th Season} as compared with dry grains. It is not clear how this canal could have been generally operative in the Eastern and not in the Western Delta. Taking their connection with markets into account, the relinquishment of wet cultivation for this canal would commence first in the Western Delta.

12 Excessive water tax. This ^{8th Season} would seem to need no remark. The tax can be excessive only under exceptional circumstances, for otherwise the general extension of irrigation in the Western Delta would not have occurred.

13. In para 16 St. Campbell gives a summary of the remedial measures he suggests. The 1st and 4th are administrative reforms which

are necessary, and which should be attended to at once. The first of June rather than the 15th should be fixed as the latest date allowable for irrigation canals to be closed. Work may of course be gone on with to a later date if water to supply them be not available, but in that case it should be understood that after that date the arrangements must be such as to admit of the canal being opened the moment water becomes available, e.g. if a sluice is being built the canal must not be kept closed to complete it, but it must be cut off from the canal until finished, water in the meantime being passed down.

The second measure viz the enhancement of the assessment of lands cultivated dry after being irrigated for some years may be desirable if there be not practical difficulties

in the way. As a means of making
a just pay for benefits obtained
it would be equitable.

The 3rd measure, the charge to
another head than irrigation of
part of the cost of drainage
can of course have no influence
on the extent of irrigation.

The 5th and last measure - the
substitution of numerous for few
irrigation offtakes - would be
a very improper step to take.
It would certainly involve the
enlargement of every canal, and
would occasion indefinite waste
of water. Side channels if by
that term is meant parallel chan-
nels may or may not be proper
in any particular case, but
single distributaries as a rule
to considerable areas are essential
to economy both of outlay and
water.

14. What is certainly wanted is an

12
examination in detail into the circum-
stances of every distributary, and
into the requirements of each
tract of irrigation which may be
found to be not well and pro-
perly supplied. Numerous off-
takes from primary distributaries
or from any distributaries sup-
plying more than one village
are unnecessary and prejudicial
to efficiency, while they render
efficient regulation of the water
supply difficult if not impossible.
The proper point for taking off
water from a distributary for
each part of the irrigation under
it should be determined, at that
point proper means of regulation
should be provided; this regulation
should be effected under the orders
of the Range Officer by the conservancy
establishment and thereafter all
irregular practices should be
firmly repressed. Without a complete

revolution in the system of payment for irrigation, water could not be supplied by wahuns and without this latter arrangement a system of numerous offtakes would be without the only safeguard which would make it practically feasible.

15. Referring now to the circumstances noticed in this office Memo No. 64 G D in respect of variations of area irrigated under certain canals in the Western Delta it is apparent that these are in great part due to mistakes in the entries under particular canals e. g. the irrigation under the following canals for 1874-75 is given by the P.W. officers and the Revenue officers respectively as follows.

	P.W.	R.O.
Mukkamala Canal	2,552	11,481
Bank Canal	16,389	7,167
	18,941	18,648

Difference 293 acres

The two canals water the same tract of country and all that is necessary is that the Revenue officers should be furnished with proper information as to the sources of supply of particular villages or parts of villages.

On the other hand such explanation does not account for the apparent decrease of irrigation shown in 1874-75 compared with 1873-74 under these two canals as shown in the Collector's statements.

	1873-74	1874-75
Mukkamala Canal	11,224	11,481
Bank — do —	10,614	7,167
	21,838	18,648

Difference 3,190 acres

Again the difference in irrigation under the Yammamadmam drain is due clearly to the Revenue officers not having been informed of changes in the source of irrigation, whereby land formerly irrigated from the drain has now been brought under canals of irrigation. The District Engineer

should carefully examine and review the yearly statements and then inaccuracies can be readily and at once be corrected. This office can deal only with the figures given, and can only notice discrepancies without being able to explain them.

16. It has to be noticed that the record of water levels in canals without similar information as to that in reach of the head sluices of distributaries, and a comparison of the latter with the normal full supply level can afford no information of value as to the adequacy or otherwise of water supply to individual areas. The information given as to water levels in the several reaches of canals indicates considerable variations from the proper full supply levels, as also apparently that more attention to regulation is required. Such

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statements need that normal full supply level should be noted as well as actual level.

Order Command.
9th Sept: 1876

Wendell H. Colwell
Chief Engineer for Suez.

To
The Secretary to Govt P.W.D.

s. for 18 Sept / 71 No 107.
 29 Sept / 74 - 2752
 12 March / 74 - 664
 26 July / 76 - 1907

P.W.D.
 93176
 7246
 from the Chief Engineer for Irrigation
 The Secretary to Govt
 M.D.

Note by the Chief Engineer for Irrigation
 W. of 9 Sept 1876.

FOR ORDERS.

Dates of Sept 76
 10

Wm. Mullins M. L. M. L.
 Joint Secretary to Govt P.W.D.

Irrigation in the Secretary's
 note submitting opinions of the
 Officer in charge of the Government
 Ranges on the cause of the
 irrigation and revenue in 1874-75
 with his observations.

103

Recd - 4-10-76 P.W.D. 6-10-76
 to C.E. - 27-9-76 P.W.D. 4-10-76
 O.H. Sherrill - Sept 76

I received these papers (without
 expression of opinion) to let the
 Chief Engineer see - in
 cluding Krishna and others for
 their remarks as to the
 necessity - I have signed with all
 the advances -

I think the interesting
 review by Mr. Mullins should
 be printed with a brief order
 from Govt adopting his
 conclusions except on the
 question of "enhancement of
 lands cultivated day after
 being irrigated for some
 years -
 I do not see how this

Of course the assessment of land
 on which does not work is an
 question of occasional
 rotation of crops & such like

can be done equitably - even
if it would not be at.

tended with very considerable
practical inconvenience -

It seems to me that if
you change a Ryd the
full value of water which

he is using it, he
should not when he
ceases to use the water,

be charged for the
undoubted advantage
derived by the land

during the time it
remains in the water
when it is afterwards

under dry cultivation

It will it seems to me
be very difficult to assess
what this advantage
is -

It would have been
better if I sent Mr. Smith

official - The practical difficulties
of the try & the great cost of experi-
ment & the advisability.

Col. Mispaher will convey
instructions & his officers
in advance of the decision of
the committee.

The discussion is able &
interesting & Col. Mispaher admires
it. 29/9 1886.

paper had been reviewed
by Beatty. But the paper
is interesting & shows
careful observation -
I would not therefore
dwell too critically
on imperfections - tho'
pointing out, as Mr.
Mullins has done,
his errors. —

W. E.
29/9

FOR ORDERS.

E. I. Form No. 14.

34
No 2597 Public Works Department.
PROCEEDINGS of the MADRAS GOVERNMENT.

UNDER date the 1 Oct 76.

Read the following:—

Note by the Ch. Engr. { H. E. D. 12112 of 9 Sept 76.
for Engr. }

The foregoing papers containing the opinions of the officers in charge of the Godavari Delta Ranges on the causes of the decrease of irrigation and revenue in 1874-75, and a review by the Chief Engineer for irrigation of the reasons adduced for that decrease particularly as regards the Eastern Delta, deal with a very important subject and will be communicated to the Revenue

Department and to the
Superintending Engineer,
Kistna, and Major Beatty
having been absent from
the District when the papers
were transmitted, Govern-
ment would wish to know
what his views are on the
subject.

2. Of the 8 reasons
adduced by St. McNail
Campbell to account for
the marked decrease of
irrigation in the Eastern
Delta, some can be dealt
with immediately by the
District Engineer and the
Canal officers. These are
numbered 1, 5 and 6 and
refer to lateness of water
supply for irrigation,
interference of improve-
ment works with water
supply, and inefficiency

of the distribution arrange-
ments. The remarks of
the Chief Engineer for
Irrigation should receive
attention with regard
to distribution the best
way of securing economy
of water and of outlay,
as well as the efficient
and convenient supply
in each case should
be carefully considered.

No. 2.

3. Of the other rea-
sons, the effect of Para
of Rule II of Revenue
Circular No 5 will be
referred to the Board
of Revenue, but His
Grace the Governor in
Council is not disposed
to consider that any en-
hancement of the dry
assessment of lands
which have been irrigated

would be desirable even
were it clear that they have
been improved for dry
cultivation by being irrigated
in previous years, and
were there no practical
difficulties in the way of
revising the assessment.

The preference of ryots
for dry cultivation, the
effect of drainage works
in making land fit for
dry cultivation, the
variation in the selling
price of paddy compared
with that of dry grains,
and the effect of the
present rates of water
tax are all points which
it will be well to watch,
and on which the opinion
of the Revenue officers
will be of value.

The influences affecting

No. 3

No. 4

No. 7

No. 8

The area of irrigation
need careful investiga-
tion not only as regards
the Godavari delta, but
for the Krishna and
other important fields
of irrigation also.

4.4/10

Recd Sept
D. E. Gadavay
" Krishna D.
C. E. J. with 10 Original Encls - 27.10.76
B. G. Rev.

Closed - 26.10.76

PUBLIC WORKS.

To The Personnel Department

Dated

Issued

Recd.

Encl.

G. O., 7th October 1876, No. 293

Nos. 103 '4

Migration in the Country

Notes - Personal notes in
writing of the Chief Surveyor
in connection with the
various divisions of
the Survey in charge
of the Survey of the
Territory on the causes
of the decrease of
irrigation and Revenue
for 1874 - 75 -

29-10-1948