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TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

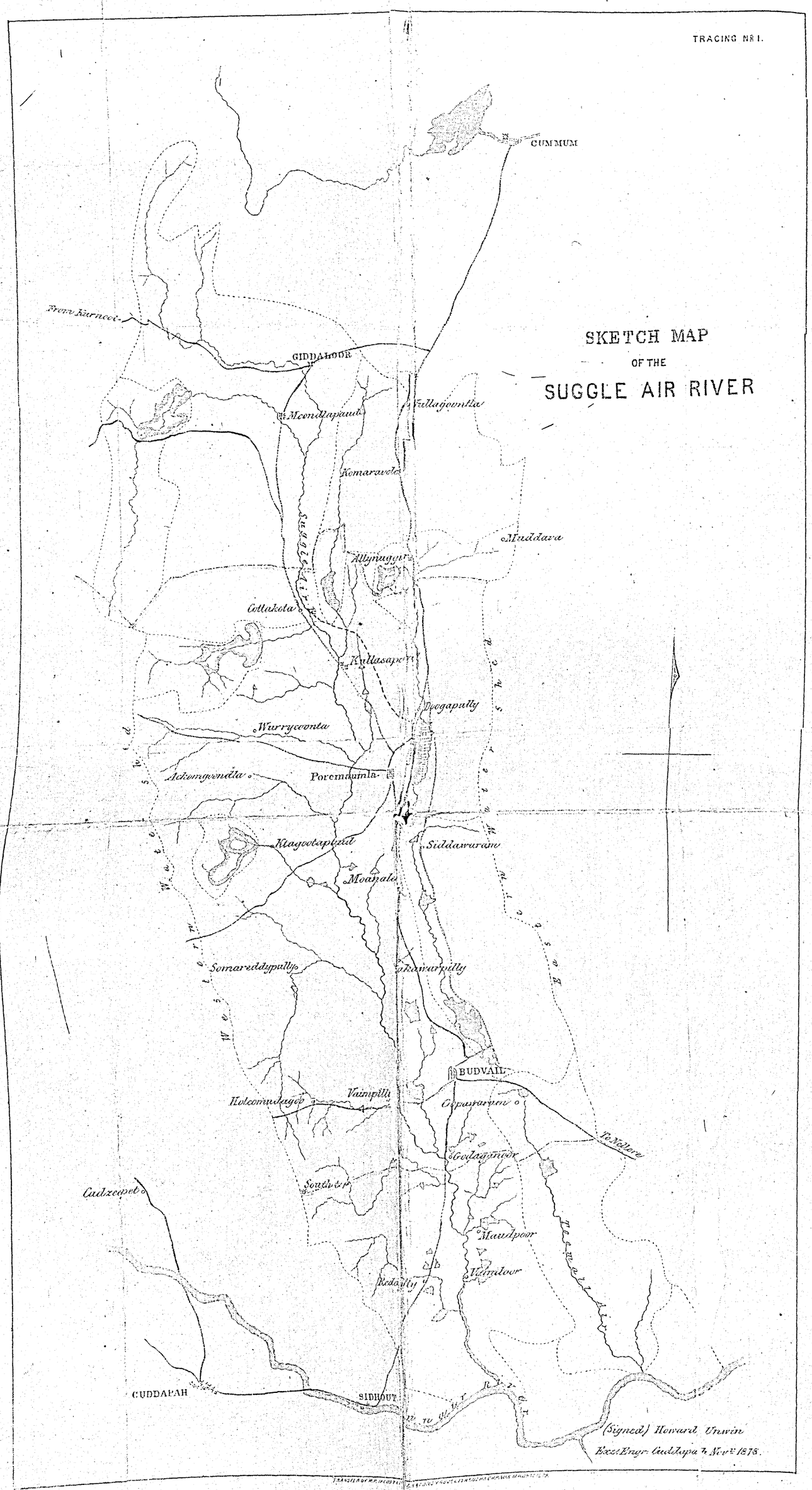
Revenue **DEPARTMENT**

G.O. No. / B.P. No.	1042	Press. / Mis.
Dated	15. 3. 1879	~~197~~

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D.G

TRACING N° 1.



SKETCH MAP
OF THE
SUGGLE AIR RIVER

(Signed) Howard Unwin
Exec! Engr Cuddapa 4 Nov! 1878.

From H. UNWIN, Esq., Executive Engineer on Special Duty, Sugglair Investigation, to the Superintending Engineer, Second Circle, Bellary, dated Camp Cuddapah, 21st November 1878.

In accordance with G.O., No. 342 I, of 18th April 1878, and subsequent memorandum, No. 39-C.D., of 3rd July 1878, by the Chief Engineer, I have the honor to submit a report upon my reconnaisance of the Sugglair river.

2. Preliminary.—For this purpose I left Cuddapah on the 15th August and camped at the following places: Codjeepet, Hotimadoogoo, Badvel, Poyalacoonlla, Porumamilla, Chintapaply, Kalasapad, Kottacota, Moondlapaud, Giddalore, and on return journey at Nalaguntla, Komaraveel, Allynagarum, Doogayapaly, Porumamilla, Moonnelli, Makavaripaly Badvel, Godagancor, Reddypaly and Sidhout, where I arrived on the 25th of October. A considerable quantity of rain fell during the time and was the cause of much inconvenience and delay.

3. At each place I made a point of seeing all the principal tanks in the immediate neighbourhood and hearing from the Reddies and principal villagers the particulars of the present water-supply and the probable results that would follow any improvements that might be made towards increasing the same. In this I had great assistance from my writer, Valoor Gooroonatha Row, who from the first took great interest in the inquiry and proved an able interpreter. From this information and personal observation I have compiled the following report.

4. Position of the River.—The Sugglair river rises in the Nallamala Hills in the Kurnool District about 20 miles due west of Cumbum; its principal course is due south, except a sharp bend of 10 miles to the east near Giddalore. About 20 miles from its source it crosses the Kurnool-Cumbum road near Giddalore and 10 miles beyond passes into the Badvel Taluk which it almost centrally divides. At the 67th mile it enters the Sidhout Taluk finally discharging into the Pennair river after a direct course of about 80 miles, or probably 120 miles if measured along the channel.

5. Description of Channel.—The first affluent of importance—in fact, it might well be the main stream—is called the Goodlavagu near the Nandicanuma pass road, for which a bridge of 5 arches 20 feet spans is provided, and shortly afterwards it joins the river on its right or western bank. This affluent and in fact the main river also up to Giddalore may be described as a mountain torrent subject to heavy freshes after every rain and quite dry in the hot weather; the river bed is largely a shaly rock laying almost vertical and hereabouts covered with large boulders and shingle of quartz and granite. Below Moondlapaud the channel becomes more open and flows in a deep well-defined bed with steep banks of a strong alluvial deposit with here and there rock cropping up. At Kalasapad, it is said, there is always water running in the dryest weather. At Moonnelli for several miles shaly rock is again seen. At the crossing of the Badvel-Cuddapah road we have a very fair sandy bed and low banks, while at Badvel and Sidhout road rock again appears; below this I believe all trace of rock disappears and the bed is composed of fine sand up to its junction with the Pennair. From Badvel downwards the river is perfectly dry for two or three months of the year, and water can only be obtained in small quantities by digging from 2 to 3 feet below bed level. In time of floods the water is confined to the channel of the river and practically no damage is done to the adjoining lands by excessive floods.

6. Fall per Mile.—The fall of the bed of the river at Kalasapad is 9·5 feet per mile; near Badvel it is 8 feet per mile and 5 to 6 feet per mile near its junction with the Pennair; the surface of the water during heavy floods is slightly in excess of these figures.

7. Catchment Basins.—Rising on the eastern slope of the Nallamala Hills the course of the river runs nearly parallel with them and from 10 to 12 miles to the east. These hills form the western boundary of the catchment basin up to Cuddapah and Badvel road, where they join the Lunkamala Hills which completes the boundary up to Pennair river. The eastern boundary is formed by the Eastern Ghats (known locally as the Velle Konda or outside hills—see Cuddapah Manual, page 271) up to the town of Badvel, where a short, narrow range of hills called the Mallama Konda intervenes up to the Pennair river, forming the watershed boundary between the Sugglair and Toomallair river, which latter runs through a narrow valley which separates this range from the Eastern Ghats. The course of the Sugglair is also nearly parallel to this eastern boundary and runs from 8 to 10 miles from it. The foot of the hills is in each case about 100 to 150 feet above the river, and the land as a rule has a good uniform slope and is well adapted

for irrigation. A low range of detached hills runs parallel to the foot of Eastern Ghats and advantage has been taken of them to form the three principal tanks in the taluk. Similar hills are to be found in the opposite side in the Nallamala, and there are traces of ancient tank works in them. The figure of the catchment basin is roughly a parallelogram which the river divides, the western half being larger than the eastern in proportion of 6 to 5 as under, the areas being measured from the atlas sheets:—

Taluk.	Western Catchment Basin.	Eastern Catchment Basin.	Total.
	SQ. M.	SQ. M.	SQ. M.
Cumbum	175	182	357
Badvel	365	316	681
Sidhout	97	50	147
Total ...	637	548	1,185

8. Affluents, Western Side.—The principal affluents rise on the western catchment basin. They are first the Goodlavagu already described in paragraph 5, then the Enamalaroo and the Kammaroo, falling into the river near Moondlapaud and Kalasapad respectively; these two are the most important feeders of the Sugglair, in fact they are called by the natives branches of it; the former has a catchment basin of 55 square miles and the latter 26 square miles above the point where they leave the foot of the hills; cross sections of each stream are given showing depth of water at high flood to be 15 and 12 feet respectively. Water is always flowing for nine months and they are rarely quite dry. As reservoirs are proposed on each of these streams some further descriptions will be found in paragraph 15. Below these important tributaries there are the Bokkinaroo and Yetamakuvunka joining the Sugglair opposite villages of Poolaveed and Moonnelli; on the latter a small reservoir is proposed (see paragraph 15). The Maderu, rising in the hills to south of Somireddipaly (see paragraph 13), joins the Sugglair a little north of Badvel, is an important stream, and there is already a fine tank upon it, but it has been out of use for last ten years. In Sidhout Taluk only two streams of importance join the river at Kamalacoor and Atloor called the Lunkavagu and Gundumvagu; the former feeds the important tank of Konasamudram which is in Badvel Taluk. Besides these affluents there are innumerable small streams of water along the whole course of the river, and in some places the right bank for a width of 1,000 feet is quite cut up and water-worn from heavy rainfall; and I am led to the conclusion that by far the largest portion of the water in the river is received from its western catchment basin.

9. Affluents, Eastern Side.—From the eastern catchment basin the first affluent is Poolivagu, which joins the Sugglair at Kalasapad; it has a catchment of over 100 square miles, but the greater part of it passes through Kalasapad Racheruvu, one of the first tanks in the taluk; during the great floods of 1874 it is said that 4 feet of water passed over the calingula 124 feet in length. This tank no doubt acts as a great flood moderator and absorbs a large portion of the rainfall on its catchment basin. There are no other streams of importance in the Badvel Taluk as the greater part of the rainfall is received by the Porumamilla and Badvel tanks which are very rarely full, and the water eventually passes into the river after it has done its duty in irrigation. In Sidhout Taluk there is only one small stream which enters the river near Vamaloor. The greater part of the rainfall on the hills is intercepted by the various tanks and passes into the river by escape or irrigation channels.

10. Discharge of Rivers.—From these cross sections of the river taken in 1873 at the site of proposed anicut above Kalasapad, I have calculated the following discharges in extreme high flood which occurred in 1874. Average area = 2,108 feet H.M.D = 8·2 feet, 11½ feet fall per mile, V = 12·3 feet per second. Discharge = 25,928 cubic feet per second. For an ordinary flood of frequent occurrence during the rains, average area = 841 feet H.M.D. = 4·7 feet, 9½ feet fall per mile, V = 8·1 feet per second. Discharge = 6,812 cubic feet and the minimum discharge for six months at least would never be less than 1,324 cubic feet per second. I have made the last calculations from gauge readings (see diagram No. 3) taken at Kalasapad in 1869 and at site of proposed anicut in 1873. The catchment area above the latter is 250 square miles. Unfortunately no rainfall registers were taken for the corresponding years nearer than at Badvel, at which station in 1869 there were 21·65 inches of rain and in 1873, 29·68 inches, while the average for six years is 33·91. From this it will be seen that I have not overstated the maximum discharge available. The maximum discharge, 25,928 cubic feet per second, is equivalent to rainfall of 4 inches over the basin, ordinary flood discharge to one inch of rain in twenty-four hours. The calculated velocity, 12·3 feet per second, of maximum flood seems high. I measured the actual velocity on 11th September when there was a very slight fresh and found

it to be 5·5 feet per second, and from a heavy flood which I witnessed at Moonnelli on the 6th October, I believe the calculations may be accepted as correct. It is undoubtedly a very rapid river (as I understand its name implies) and it is no uncommon thing for a rise and fall of several feet to take place several times in twenty-four hours. The diagrams do not show this, but the readings at Kalasapad were taken under the superintendence of Mr. Spencer, the S.P.G. Missionary, and the register clearly shows this fluctuation. The whole of this water except what may be lifted from wells on the river banks runs directly into the Pennair river. It is entirely lost, and in 1876 more than sufficient water to save the crops of the taluk was flowing idly to waste.

11. Rainfall.—In the appendix to Circular, No. 73, of 27th November 1875, will be found the rainfall at Badvel for 1866—74, the average being 33·91. I have added (see Appendix A) the rainfall from 1875—78 together with the register of six other stations, all in the valley of the Sugglair. This series is too short to make any useful deductions and the drought of 1876, in which only 8·12 inches fell, is, we all trust, exceptional and should be eliminated. It will therefore be more useful to refer to the earlier series from 1866—74, and we find at Badvel the minimum rainfall was 18·73 inches in 1866 and the maximum 46·51 inches in 1872. I cannot learn that anything remarkable occurred in 1872 with this heavy fall, but the whole country side remembers the rainfall of 1874; this measured 39·69 inches and is the only year for the last thirty that the large tanks Porumamilla and Badvel have filled. The explanation may be found in the distribution of the rainfall, and, omitting the fall in November and December in each case, the latter year has the heaviest fall. The one fact to which I wish to draw attention is that the only year which gave a satisfactory rainfall to the people was 1874, and it was nearly 3 inches greater than the average fall, a good and sufficient reason, I think, for increasing artificially the water-supply for irrigation.

12. Tanks on the Eastern Catchment Basin.—With the exception of one or two small supply channels from the Sugglair river in Cumbum Sub-division, the river is altogether useless as it is for irrigation, and numerous rain-fed tanks and wells are the only means used for this purpose. In Appendix B is given a list of all tanks above 100 acres ayacut, with particulars of cultivation and revenue. The area under wet cultivation in Badvel is only 13,692 acres out of a total area of cultivable land of 135,345 acres, showing there is ample room for extension. With one exception, the Kalasapaud Racheruvu, the supply to each tank is insufficient, precarious, and a constant cause of complaint among the villagers. Excluding Porumamilla and Badvel large tanks all the others are as a rule shallow sources with long low bund, and they rarely hold three months' supply. The Kalasapad Racheruvu with its 98 miles of catchment basin is exceptionally well situated, surrounded by high peaks and closed at its southern end by a short high bund in which there is an escape 124 feet long (see paragraph 9). In 1876, with a rainfall of 9·59 inches only at Kalasapad, it was nearly dry and there was no cultivation under it, but in ordinary years no complaint is made about the supply. The ayacut is 998 acres, equivalent to 10 acres per mile of catchment, but it might be largely increased if better means of distribution were used. The bulk of the surplus passes directly into Sugglair river by the Poolivagu, a small quantity feeds Kalasapad small tank, and thence to river. The small tanks north of Porumamilla tank are all insignificant; the villagers are asking for more, and one enterprising man has thrown up a bund at a cost of Rupees 300 or Rupees 400 without permission. I pointed out to the Tahsildar that this should not be allowed as it reduced supply to large tank. If this can be filled by other means, a number of these small tanks might be improved and a large area of waste land cultivated. The large tank itself, in spite of 91 miles catchment, seldom or ever fills. In Appendix C is a rough record of its regimé, but as no gauges exist it is only an approximation. There is an impression that an important supply was cut off some years ago near Allynagarum. I examined this and found a rough stone wall thrown across the stream near the village of Muddava to throw the water northward, but practically it can have very little effect in checking the natural course of stream to the south. Once only, in 1874, for the last thirty years has the tank filled and discharged a surplus. The present ayacut is 3,091 acres, equivalent to 33 acres per mile of catchment; it might be nearly doubled if constant supply was insured, and nearly every tank to the south up to Kodur would receive a corresponding benefit as the surplus water passes from one to the other. The next group of tanks is in connection with Badvel large tank commencing with Sidavaram on the north; the total catchment basin is 87 miles. The same tale is heard of this series: each tank has short supply and the large tank overflowed in 1874, only the first time for twenty years; as a rule it is 10 or 15 feet below calingula crest. To-day it is 10 feet below in spite of wet season. Immediately adjoining and to the south of the large tank is the Badvel Racheruvu with catchment of 3 miles; it surcharges into the former, the crest of calingula being 5 feet above crest of the large tank calingula. There is a third tank at a low level adjoining the Racheruvu and close to town of Badvel called Nagulcheruvu, which receives its supply direct from the other two tanks. All these tanks are in the same catchment basin, and the respective ayacuts are—

	ACRES.
Large tank and Nagulcheruvu	3,140
Racheruvu	370
Total ...	3,510

equivalent to 40 acres per mile of catchment basin. At the north end of the large tank a cut about 10 feet wide was made through the hills in the time of the Moguls to lead water to Problaveed tank, but it has not been at work within present memories. The escape at the north end is a fine work, 157½ feet wide; the channel discharges into the Chenuampully tank. Two sluices situated at north and south ends distribute the water; the surplus passes into the last-named tank and from thence to Godaganoor tank and the Sugglair river. The tanks to the south of this depend entirely upon the rainfall of their respective catchment basin, and the same may be said of the tanks in the Toomalaroo valley (see appendix), commencing with Godaganoor at the north; this is a fine tank, but very insufficient supply of water and, if possible, it should be improved as the whole valley will share in the benefit. In Sidhout Taluk there are six tanks only with an ayacut above 100 acres (see Appendix D); the total acreage being 1,404 and assessment Rupees 12,279, while the average collection for the five years 1281—85 amounts to Rupees 7,659 only, clearly showing that the supply of water is deficient.

13. Tanks on the Western Catchment.—On the western catchment basin there are no very important tanks. The Sommireddipaly tank (see paragraph 8) has a very fine site and catchment basin of ten miles. The bund is constructed across the line of the Maderu channel, but it was breached some ten years ago and has not since been repaired. It has a particularly fine masonry escape calingula built by Mr. Lewis, a late Supervisor in the department. In Appendix E the Tahsildar gives the probable ayacut as 269 acres and assessment Rupees 1,345 if the tank is repaired. The Vanurpally tank near Hotimadoogoo is another old tank which has been out of repair for last ten years. It has a fair site, will hold eight months' supply, and will irrigate two miles of country. The breach is 200 feet wide and 20 feet deep in centre of bund, probably caused by insufficient escape; this can be easily increased at north end by cutting away natural rock. The Tahsildar gives probable ayacut as 828 acres and assessment Rupees 2,184 and second crop Rupees 873, besides an additional 582 acres which will be brought into cultivation after five or six years. I think both these tanks should be repaired and kept in working order. In Sidhout Taluk there are only six tanks above 100 acres ayacut (see Appendex D); they are constantly short of water, and the average collection for the five years 1281—85 amounts to Rupees 6,594 out of an assessment of Rupees 10,286. The following table is a short summary of the tank statements.

—	Area.	Assessment.	Average Cultivation.
	ACRES.	RS.	
Badvel Taluk.			
Eastern catchment	13,334	92,263	68,589
Western do.	628	7,028	3,932
Total ...	13,962	1,06,291	72,521
Sidhout Taluk.			
Eastern catchment	1,685	1,41,797	8,657
Western do.	1,738	13,425	8,871
Total. ..	3,423	28,222	17,528
Grand Total ...	17,385	1,34,513	90,049

The average collections are for the five years 1281—85, including certainly one bumper crop of 1874 and excluding the famine year, and yet they exhibit an annual loss of Rupees 44,464 to Government, due, I may say, certainly to a deficient supply of water. The ryots at the same time are great sufferers as they frequently raise a dry crop on wet lands and pay full assessment for it, the value of the crop being only half the value of the rice crop. In the Badvel Taluk the collective area of the catchment basins of all the tanks is 437¾ square miles, the total area of the basin being 681 square miles. I am unable to give the corresponding figures for Cumbum and Sidhout, but they will be considerably less in proportion to the area of the respective basins.

14. Land-revenue Statement.—Having thus examined the present water-supply of the valley, the next point of inquiry is the area of the land at present irrigated and probable increase that may accrue if the water-supply is improved. In the Cumbum Taluk the total area of western and eastern catchment basins is 175 and 182 square miles respectively, and, according to a statement received from the Deputy Director of Revenue Survey, the areas which

have been surveyed are 57 miles and 19 miles respectively; this includes village sites and jungles The details of cultivation are—

—	Under Cultivation.		Cultivable Waste Land.	
	Dry.	Wet.	Dry.	Wet.
	ACRES.	ACRES.	ACRES.	ACRES.
Western villages	19,062	1,159	4,477	56
Eastern do.	8,595	181	3,931	2
Total ...	27,657	1,340	8,408	58

shewing a very insignificant area under irrigation. I asked the Collector of Cumbum in my No. 19 of 19th September to furnish me with a statement of the probable increase in wet cultivation if water is supplied, but in spite of repeated reminders no reply has been received, and I feel compelled to close my report without it. From my own knowledge of the country I am justified in stating that at least 8,000 acres of dry cultivation could be irrigated, which at Rupees 3 per acre would produce Rupees 24,000 annual revenue. In Badvel Taluk the two catchment basins are 356 and 316 square miles respectively; and from the Collector of Cuddapah I have received complete statements of the present revenue and probable increase (see Appendices and G F) the totals being—

—	Appendix F.		Appendix G.	
	ACRES.	RS.	ACRES.	RS.
Present revenue	41,354	45,589	14,745	52,164
Probable increase	5,474	28,965	9,148	30,000
Total ...	46,828	74,554	23,893	82,164

This shows an enhanced revenue of over 50 per cent. on the present amount. I find some few villages have been omitted from the statement, but it is sufficiently exact to encourage a large outlay for the purpose of improving the condition of the taluk. In Sidhout Taluk the catchment basins are 97 and 59 square miles respectively. From the Tahsildar's statement (see Appendix H) the totals are—

—	Area.	Amount.
	ACRES.	RS.
Present revenue	16,243	49,839
Probable increase	3,567	10,701
Total ...	19,810	60,540

The improvement anticipated in this taluk is considerably less than in Badvel, and only shows an increase of 21 per cent., but the water-rate per acre is taken at Rupees 3, which is certainly below the average. In Badvel Taluk the Tahsildar states that the assessment on dry and wet lands is Annas 12 and Rupees 7 respectively, and the average compensation to be paid for each would be Rupees 13 and 67 per acre. The Sidhout Tahsildar gives Rupees 1-7-0 and Rupees 6-1-0 per acre as the average assessment on dry and wet lands.

15. Proposed new Reservoirs.—In proposing means by which irrigation may be developed and improved, the question naturally divides itself under two heads; first, new works for districts where irrigation is not at present in use; and, second, improvements in the existing means of irrigation by which they may be rendered more efficient and reliable and absolutely free from all risks of failure or short supply of water. I am of opinion that the latter is the more important work of the two for this locality, and whatever funds are available should be expended in perfecting the present system before breaking fresh ground. I will, however, dispose of the first head in its order and describe some new works which promise favorable results and appear

worthy of further consideration. The Chief Engineer in his memorandum suggested three sites for reservoirs, the first to the north-west of Giddalore. I could not learn of any favorable site to the north of the Nundicanuma pass road, but a little to south of west from Giddalore on the Yanamalaru stream (see paragraph 8) there is an admirable site. A cross section of the gorge between the hills is given in Tracing No. 4; the place is called Goondlamotoo, an exceedingly picturesque spot with an almost vertical wall of granite crags on one side and luxuriant undergrowth and some fine trees. The gorge is very short and opens into a splendid ampitheatre of hills some 2 miles diameter. I climbed with great difficulty to the top of low saddle and found it from 200 or 250 feet above gorge (by Aneroid barometer); it was exceedingly steep, covered with jungle and not 30 feet wide on the top, but it would be too expensive to cut down for an escape channel, which must therefore be made in line of dam on south end. The total length of dam will be 600 feet, the catchment basin is 55 square miles, and I roughly estimate the water-spread of tank with a 40-feet bund to be 3½ square miles. I made no measurements to ascertain capacity; probably it will contain 800 millions cubic feet. A few acres of dry cultivation would be submerged; the rest is all scrub jungle. In days ago a large quantity of iron was made in the valley, but all trace of the manufacture has vanished except the refuse slag. The stream rises in the northern slopes of Hobobaliam Pag, one of the highest peaks in the district which seemed constantly enveloped in clouds while I was in the neighbourhood. The stream is said to be only dry for two months in the year and even then water is found in the ponds. At site of dam rock crops up in river bed. Building stone can be procured in any quantity on the north hill, limestone within two miles, and good soil for dam at site, but I am inclined to think a masonry dam would be most suitable here with escape weirs at each end. As an experimental measure a low dam might be constructed at first, to be raised as irrigation developed. The gorge is situated 6 miles from Moondlapaud; half the distance is fairly under cultivation of dry crops and the other half scrub jungle; the whole area from 10 to 12 square miles will raise wet crops and lays well for irrigation. The next site for a reservoir which I examined is the second referred to by Chief Engineer in the village of Kottacota to the west of Kalasapad. This is on the stream called Kanamaru (see paragraph 8). This also rises in Hobobaliam Pag, but on the southern slopes which, I am inclined to think from various indications, yield more water than the northern slopes, the stream is said to be rarely or ever quite dry. A cross section of the gap between the hills is given in Tracing No. 5 from actual levels, together with a section of the watershed on southern side, where an admirable escape channel can be made and the surplus will return direct to the Sugglair river by natural channel near village of Tellapaud. The catchment basin above site of dam is 26 square miles; the area which would be occupied by the reservoir is much broken up by small hills and it is difficult to form even a rough estimate of its area or capacity; the villagers say as large as Porumamilla. I venture to say the waterspread will be 3 square miles and capacity about 1,000 millions cubic feet with a dam 43 feet high from the bed of the stream. In working out the details it may be possible to make the dam 53 feet high, and it will materially decrease cost of escape channel. There are only one or two small fields of dry cultivation within the site; very fair building stone of shale rock can be quarried on the hill, good sand and limestone within half a mile, and good soil for making a bund is close at site. Within the valley and about three-quarters of a mile higher up there is a small tributary to the Kanamaru called Palacondavagu and a good site for short dam with a natural escape outlet. At this place one Venkatarao has made a petition for permission to construct a reservoir. He was with me when I made my inspection and would be quite satisfied with the larger reservoir, and I think Government should undertake to construct it or allow him to carry out his own work. The land to be irrigated covers an area of 10 square miles between the villages of Kottacota and Tilapaud; it lies well for economic distribution, in fact the area of the land available is greater than the storage can supply with water. In Appendix J is the probable ayacut as given by the Tahsildar showing a revenue of Rupees 33,780. Fair dry crops are now raised in the neighbourhood; the wet cultivation is practically *nil*. I am very much in favor of this project and recommend most strongly that detailed plans be prepared which will, I trust, confirm very good opinion of it. The third site for a reservoir which I have to describe is situated in the catchment basin of Porumamilla large tank, a mile to the west of Allyanagarum. A cross section of the gap is given in Tracing No. 4; the catchment basin is very small, only 4 square miles; but it is believed at times the rainfall is excessive, being entirely on the hills and the southern slope of the Reddycherla peak, which is a conspicuous and lofty hill. The valley which would be submerged is about 1½ square miles in area, all jungle and waste lands; a small central hill will reduce the capacity of tank considerably, but with a dam 50 feet high the storage will be roughly 300 millions cubic feet, equivalent to a rainfall of 33 inches. The site for the dam is a rocky gorge about 500 feet long and immediately below it there is a waterfall about 80 feet deep; a low saddle on the south side will form an admirable escape. The stream was quite dry when I saw it in September, but it fills with the slightest rainfall and there are indications that it is frequently a perfect torrent. Probably a masonry dam would be most suitable as rough stone slabs for building are available and also kunkur limeearth suitable for embankment can be had within one quarter of a mile. The land to be irrigated is about 2½ square miles and belongs to Allynagarum and adjoining villages. The fourth site for reservoir is situated in the western catchment basin, a little south of Porumamilla at the village of Itigoondlapaud; a cross section of the gap is given in Tracing

No. 6. The catchment basin is 12 square miles, in which there are three distinct streams; the southern stream is rarely quite dry and is said to contain good springs. A small village, Bommupapayapaly, consisting of thirty houses and about 200 acres of dry cultivation would be destroyed. The dam would require to be about 50 or 60 feet high and the surplus water would escape over a low saddle towards the village of Ambavaram. A central hill will in this case also spoil the capacity, but exclusive of it I estimate roughly the waterspread will be 2 square miles and probable capacity 500 millions cubic feet, or (say) 20 inches of rainfall. The land (more than can be used) lies favorably for irrigation; fair dry crops are now raised, but I believe wet cultivation would be at once taken up and a considerable area of waste land also brought into use. The Reddi of Itigoondlapaud (which is a large and important village) promised 800 acres from two villages only. Within the gap there are remains of an old bund called Maradumani Kutta made in the Mogul period; it does not seem the best site for the dam, but when detailed plans are made it should be examined and possibly utilized. No records exist of this old work, but there is a talk from the great grandfather's time that rice was grown under it. The villagers are very anxious for the new reservoir, and I believe it will well repay further investigation; good soil is available for the dam and also clay for puddle, fair shaly rock and kunkur lime. It is reported that good sites for small reservoirs can be found near Akkengoondla and Waryeoonta a little to the north of Itigoondlapaud; these should be examined also. The third site suggested by the Chief Engineer, about 3 miles above Ponnair river, offered no advantages for a reservoir, but a little to the west of Kondoor on the Goondumvagu I examined a site where the stream leaves the hills; a dam is practicable by closing two short gaps, but the area enclosed would be very limited and would not repay the cost. A similar site is reported on the Lunkavagu just below "South Top," and I am sorry it has not more favorable advantages, as a good reservoir in this neighbourhood would be very beneficial. During the famine the Tahsildar proposed to construct small tank fed by surplus from Konasamudram tank at a place called Chalamarenuka but the site has no special merit and the supply of water would be small and uncertain.

16. Proposed Works in Cumbum.—Of the works required and proposed to improve the existing means of irrigation, the first is situated in the Cumbum Taluk, where there is a large tank on the 75th mile of the Kurnool-Cumbum road; it has been for many years laying useless although the Reddy (an old man) says his father remembers it being in good order. The tank was filled by a supply channel from the Sugglair river; about half mile long traces of it still exist. This will require remaking and the tank bund might be raised and extended parallel to the main road to increase capacity. An outlay of Rupees 20,000 would render the tank fit to supply 1,000 acres of land which lies between it and the village of Kristenusetypaly. I was given to understand that an estimate was framed for the repair of this tank during the famine, but although I have repeatedly written to the Range Officer at Cumbum for it, I have had no reply, and for some unaccountable reason I have failed to obtain a rainfall statement of Cumbum and also particulars of another work which was proposed and commenced some years ago for excavating a supply channel from the Sugglair river near Geddalore to the Cumbum tank. The work was stopped shortly after it was commenced, and as Cumbum tank is now well supplied with water the project need not be resuscitated. The Sub-Collector, Mr. Fawcett, informed me that the channel would largely benefit the lands under Racherla tank situated between Geddalore and Cumbum, but he did not think it would prove a very remunerative work.

17. Proposed Work in Badvel.—In Badvel Taluk the most important work proposed for the improvement of present means of irrigation is the construction of a supply channel from the Sugglair river a little above Kalasapad to Porumamilla tank and from thence to Badvel large tank. The progress that has been made with this project I have already described in my No. O. of 20th July 1878. I have since been over the ground with the plans, and, having taken a few additional levels, the following alterations are suggested. It has already been shown (paragraph 12) that these two large tanks, if well filled, are capable of giving supply to the greater part of the rest of the valley, and in paragraph 11 it is stated that these tanks only fill in years of maximum rainfall; hence the necessity of an artificial supply, and it must be conceded that there is no better way of improving irrigation in the valley than ensuring an ample supply to these two tanks. In my preliminary report mention is made of the fact that the remains of the old supply channel of the Mogul period are to be seen. These remains are clearly to be traced from the site of the old anicut up to Porumamilla tank, except in few places where flood water has washed away the channel or the banks have been ploughed in by cultivation. The channel goes by the name of the Ramachendra Kalva; no record exists to furnish any information on it, but the story current is that the Nizam of the period directed the construction of the channel, and, finding it was afterwards called by the name of the Engineer, he ordered it to be breached. Be that as it may, I see no reason to doubt that the channel was completed and in thorough working order; a very small amount of neglect would bring it to its present condition, and the apathy of more modern rulers is quite sufficient to account for its being left out of repair and useless. I would suggest, in preference to the line as selected by Mr. Lewis, that this old channel should be reconstructed. The accompanying plan and sections show both lines; the old line occupies far less valuable land than the new one. It is longer by 2 miles, but the total earthwork will be less; a larger area of land near Bramhanapaly will be commanded for irrigation;

Ramachendra Kalva.

the villagers intrusted prefer it (see Appendix K). A section of remains of old weir are given in left hand corner of plan; it consists of a mass of well-fitted large boulders and rough stone set in very strong, coarse mortar; a length of 200 feet is, I believe, as sound and good as ever it was and only requires a fresh apron; it will be necessary to reconstruct a length of 250 feet, making a total effective length of 450 feet*. The bed of river is rock, which at alternative site is clay and boulder; it would seem desirable to construct a small under-sluice in weir to prevent supply channel sluice from being silted. I propose level of this to be 70·00, crest of weir being 80·00; the first 6 miles of channel will have a fall of 47 feet per mile. Between one mile and one mile four furlongs the construction will be difficult, as the river sweeps round the foot of every sloping hill composed of loose stones and debris from above; it will be desirable to direct the river by a groyne or two, and for a length of 600 feet from the channel with a concrete floor and side slopes (building stone is scarce, but there is good material for concrete); at 3 miles 5 furlongs the Polivagu is crossed, a considerable stream (see paragraph 9); an aqueduct or weir must be provided for this. It is not clear what arrangements were made for the old channel as all trace is swept away in the low ground, but near 4 miles there is a dry packed weir 212 feet long on the right bank of the channel which has stood well and might still be used as an escape for extraordinary floods. Along the hill side from this point to junction with Kalasapad small tank there is one bund in fair order revetted in places and three or four sluices all wanting repair. The bund and present rough stone calingula of Kalasapad tank will require repair, and a regulator should be built on supply channel at 6 miles 5 furlongs. The traces of old channel from this to 8 miles 6 furlongs are faint as part of the land has been cultivated; at 8 miles 1 furlong a small stream is crossed having a watershed of 9 square miles. From 8 miles to 6 furlongs to junction with Chintalpaly tank the old channel is ready with the lower bund made, and it only requires extensive repair. No regulator will be required at the tank as the water will flow over the rocky spur of the hill. Assuming the supply will be 6 feet deep it will have a fall of feet 6·75, the respective levels being water in channel ... ... = 36·75

F. T. L. ... ... = 30·00

Mr. Lewis proposed to raise level of this tank 6 feet and make it equal to F.T.L. of Porumamilla tank reduced level = 35·10. For the present at all events, and for reasons of economy, I would propose to keep the F.T.L. of Porumamilla tank at 30·00 and, instead of cutting through saddle, I would carry supply channel round the foot of the hill to the present calingula. A section of this alternative line is given in right hand corner of plan. A regulator would be required at the tank and the present calingula would remain to discharge extraordinary floods. My chief reason for reducing the water in Porumamilla Tank is to save at least 500 acres of dry cultivation on the eastern margin together with several villages which would have to be abandoned; if water was always kept at 35·10 an occasional flood is said to do no harm. Again, in considering the extension of the supply channel to Badvel tank (see paragraph 18), it may be difficult in seasons of drought to keep Porumamilla tank up to 35·10. The superficial area at that level is 111¼ millions square feet, average depth at 6½ feet, and capacity 26¾ million cubic yards. Unfortunately the cross sections which were taken in 1869 to determine this are lost, but the capacity at a F.T.L. of 30·00 may be estimated at 15 million cubic yards, and it should be possible to maintain this level for at least nine months out of the twelve. It is a difficult problem to determine the most desirable size of the supply channel. The old channel varies from 10 to 20 feet in base and is very irregular. Mr. Lewis estimated for a channel 6 feet deep, 15 feet base, and fall 4½ feet per mile, which will discharge 630 feet per second or sufficient water for 29,000 acres at 50 acres per foot per second; this may seem larger than necessary, but the cost will not be very much reduced by adopting a smaller section of channel. The head sluice and regulator would require three openings each 6 feet wide and should be provided with ordinary calingula boards so as to regulate supply. An escape should be built at each regulator to dispose of surplus water. Small sluices will be required at intervals of one or two miles to give direct irrigation from the supply channel and short branch channels to feed the neighbouring tanks. I have not prepared any rough estimate of the probable cost. Mr. Lewis gives Rupees one and-a-half lakh as the estimate for his project, but this was in 1869 and probably rates are somewhat enhanced. I believe with the alterations I have proposed that the work will be less and the cost may be taken as the same, Rupees 1,50,000. The probable return on this expenditure is shown in Appendix G., a statement received from the Collector, which exhibits an increase in revenue for the improved water-supply of Rupees 30,000 per annum. The present area of wet cultivation is given at 4,821 acres and probable increase 9,148 acres, making a total of 13,969 acres. These figures speak for themselves and I need add no more in favor of this portion of the project. I am of opinion that detailed plans and estimates should be at once submitted and the work put in hand this season.

18. The above forecast by no means represents all the benefits that will be derived from the construction of the supply channel, as the extension of it to Badvel large tank and also an extension to Chennaredypett and Boppapuram tanks and on to Kodur will add considerably to the probable increase in revenue. The old Ramachendra Kalva evidently provided for this as

* Which with a depth of 3 feet of water will carry off 23,152 cubic feet per second (compare paragraph 19).

remains of the channel are still in existence. For the latter work the water is led from the south sluice of Porumamilla tank by a channel at foot of hill and along the western side up to Chennaredypett tank. For a length of half mile the channel is from 10 to 15 feet deep; the rest is surface forming and only requires clearing out and the bank repaired. I recommend this channel very strongly as it will benefit all tanks up to Kodur, and I believe it may be extended by cutting a channel between the road and the hills up to Poyalacountla tank which is capable of being enlarged and forming a storage reservoir for the tanks to the south up to Problaveed.

The extension of the supply to Badvel large tank is a distinct channel and details are shown in plan (tracing) as prepared by Mr. Lewis; these will have to be modified if my proposal is carried out to reduce F.T.L. of Porumamilla tank to 30·00 instead of 35·10 (195·00 and 200·00 on new datum); and it will not be possible to supply Siddavaram tank, but the channel will pass to the eastward and supply all other tanks in this valley up to Badvel. The dimensions of proposed channel will be 15 feet base, slopes one to one and six feet depth of water with a fall of 1½ feet per mile; this will discharge 378 cubic feet per second. The maximum depth of cutting between Porumamilla and Sidavaram will be 28 feet, and just below the latter tank it will fall into the natural drainage line and terminate at Badvel large tank. An approximate estimate of cost amounting to Rupees 1,50,000 is given in Appendix L. Mr. Lewis estimated the cost of his channel at Rupees 25,000; assuming the average depth of cutting to be 8 feet and length 2 miles, it would certainly exceed this and I think he has miscalculated the depth.

The capacity of Badvel large tank is given by Mr. Dady as 55½ millions cubic yards with F.T.L. = 60·29 (Porumamilla tank being 200·00). Adjoining the large tank on the south is the Racheruvu and only separated by a bund and calingula, which is 5·0 above calingula of large tank. I propose to raise F.T.L. of latter to 65·29 and make one reservoir of it. The calingula body wall, which is 157½ feet long and 4 feet wide, would have to be raised; the banks in other respects are sufficiently high and strong. The extra storage room would be about 18½ million cubic yards. I think it just possible in days gone by that F.T.L. may have been even higher than 65·29, as the four pillars which carry the chain of the northern sluice are much higher than necessary, and there is a spare granite pillar laying on the ground which is 42 feet long and 2 feet 4 inches square, altogether too large for the purpose required. The water for the tank is distributed from two sluices—those on the north 6′ × 3′ and on the south 3′ × 3′. Excessive surplus finds its way direct to the Sugglair, otherwise it is led by field channels to Chennampali, Godaganoor, and Puttayapaly to the Sugglair, a very small portion only to the latter two. The total ayacut of large tanks in the Badvel group is shown in Appendix B, being 6,087 acres and assessment Rupees 31,707; an increase of 50 per cent. may be safely assumed amounting to 3,000 acres with a revenue of Rupees 12,000, a sufficient return to justify the proposed outlay compared with the actual collections; the probable results are even more favorable and a constant uniform supply of water is secured to the present area of cultivation. The Badvel-Nagulcheruvu (see paragraph 12) is also fed almost entirely from the surplus; it is situated in the angle between the Porumamilla road and Nellore road close to Badvel. It is not shown in atlas sheet. I propose that a supply channel be cut from this tank, passing under Nellore road through Kottapaly Agraharam to Chintalacheruvu and from thence to all tanks to the south as far as Vainaloor in Sidhout Taluk. I have walked the whole length of this line, and, as far as the eye could judge, it is quite feasible and would be inexpensive. In every single tank an increased water-supply is wanted and the ayacuts could be increased 50 per cent. if water is given in sufficient abundance. Mr. Lewis proposed to feed these tanks by an anicut on the Sugglair at the crossing of the Nellore road as described in my preliminary report. This in some respects is a better way, but I expect the cost would be too high to give a remunerative return. Until a trial section is taken of the line I have not thought it necessary to prepare any details of the probable increase in revenue. I am satisfied on that score that it will well repay further investigation. Another supply channel might be constructed from the southern end of the Badvel Racheruvu near village of Dodepalli crossing the Nellore road to feed Gopavaram tank. I have inspected this portion of the line and I am informed it is quite feasible to extend the supply to all the other tanks in the Toomalaroo valley. A detailed statement of these tanks is given in Appendix B.

	Area.	Assessment.
	Acres.	Rs.
9 large tanks	1,196	8,160
23 small do.	1,022	7,797
7 private do.	644	5,431
Total ...	2,862	21,388

And the probable increase in wet cultivation will be 1,000 acres yielding Rupees 4,000 annual revenue, a sufficient return to justify a survey of the project to be prepared.

19. The tanks situated on the western catchment basin do not offer the same facility for an improved supply of water as those on the eastern side; the details are shown in Appendices B and D. I failed to discover any extensive and feasible project which would benefit them, and, beyond the repairs to existing tanks already noted with a few minor works now under consideration in Sidhout Taluk, I have no additional works to recommend.

20. Recapitulation.—In conclusion I would recapitulate what I have endeavored to show.

(*a*) That there is an ample area of land available for a large increase in wet cultivation.

(*b*) That there is sufficient supply of water if it is properly applied.

(*c*) That the existing means of irrigation by rain-fed tanks is insufficient and unsatisfactory and requires to be improved.

(*d*) That it is possible at a reasonable outlay, by the construction of reservoirs and supply channels, to ensure a constant supply of water to at least three-fourths of the cultivable area and to ensure, as far as human ingenuity and forethought can accomplish, an absolute security from the ill effects of drought.

21. Recommendations.—The most important and principal work to be carried out first is the reconstruction of the first section of the Rammchendra Kalva from the Sugglair river to Perumamilla tank. With the information already available I think it would be possible to prepare and submit detailed plans and estimates for it within the next three months. I submit an estimate (Appendix M) of the probable cost of the same.

22. The next work of importance is, I think, the extensions of the same channel: first, the high level line to Badvel as proposed in paragraph 18; and, second, the low level line (see paragraph 18); the other extensions may stand over until the channel to Badvel tank is an accomplished fact.

23. Of the proposed reservoirs, the one on the Kanamam as described in paragraph 15 is, I think, the first in importance if a selection has to be made; but I trust that orders may be passed for all four sites to be thoroughly examined and plans and estimates prepared for approval.

Additional Note.—Since writing I have had the opportunity of seeing Colonel Mullins, R.E., and he has pointed out that, unless absolutely necessary, it will not be desirable to lower the F.T.L. of Perumamilla tank as it will lessen the storage capacity and materially increase the cost of the extension of the supply channel to Badvel. I estimated this at Rupees 1,50,000 and I find if F.T.L. is kept at its present level (35·10), the approximate cost will not exceed Rupees 75,000. It only remains to examine the question of damage which the marginal villages will suffer if the tank is kept constantly full at a contour level of 35·10. This can only be ascertained by a careful survey of the contour line and the boundary of the tank as laid down on the last Revenue Survey. And it can be then left to the Revenue authorities to settle it. If it is decided to keep the tank to its present level it will be necessary to raise the bank of Chintalpaly tank, as proposed by Mr. Lewis, at a cost of Rupees 7,000. The reconstruction of the Ramachendra Kalva will not be effected in any way by this alteration.

(Signed) H. UNWIN,
Executive Engineer.

Appendix A.

Rainfall Register for Cuddapah District from 1875 to 1878.

Months.	Badwel Taluk.								Sidhout Taluk.			
	Badvel.		Hottimadugu.		Perumamilla.		Kalasapad.		Poyalacuntla.		Sidhout.		Redypaly.	
	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
1875.														
January	..	..	..	..	..	..	..	..	..	..	..	..	..	..
February ..	1	1·05	..	..	..	..	..	..	..	..	..	0·1	..	..
March	..	..	..	..	..	..	..	..	..	..	..	..	..	..
April	3	3·30	..	..	..	..	..	..	..	..	..	0·6½	..	..
May	2	0·80	..	..	..	..	..	..	..	..	..	2·1	..	..
June	4	2·60	..	..	7	1·20	..	..	..	..	..	2·6½	..	..
July	9	3·25	..	..	10	1·95	1	0·01	3	1·37	..	0·8½	5	2·70
August	11	4·20	6	4·65	6	3·55	1	0·25	..	..	..	7·4	9	4·70
September ..	4	1·80	..	..	1	0·05	3	0·51	..	..	..	3·2	7	3·75
October	1	0·50	..	..	1	0·85	3	..	..	..	..	..	2	0·15
November ..	1	1·40	1	1·15	..	..	..	..	..	..	..	0·6½	4	1·50
December ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	31	18·55	7	5·80	25	10·48	7	0·77	3	1·37	..	23·8	27	13·10

Rainfall Registers for Cuddapah District from 1875 to 1878—(*continued*).

Months.	Badwel Taluk.										Sidhout Taluk.			
	Badvel.		Hottimadugu.		Perumamilla.		Kalasapad.		Poyalacuntla.		Sidhout.		Redypaly.	
	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
1876.														
January	..	..	..	..	..	..	..	..	..	..	..	..	..	..
February ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
March	1	0·45	..	..	1	0·60	3	0·27	..	..	..	0·6	..	..
April	..	..	..	..	3	0·39	2	0·06	1	0·05	..	..	1	0·30
May	1	0·30	..	..	2	1·18	3	0·30	2	0·45	..	0·2	1	0·30
June	..	..	3	1·05	6	1·22	8	1·31	3	0·42	..	1·3½	2	0·49
July	1	0·5½	1	0·15	4	0·84	6	1·91	3	0·70	..	0·7	1	0·20
August	8	1·5·5	7	3·35	9	4·74	11	4·64	6	4·15	..	3·6½	4	2·60
September ..	..	..	2	1·00	1	0·10	5	0·33	1	0·20	..	1·2½	..	..
October	..	..	..	..	..	..	1	0·21	1	0·70	..	..	..	..
November ..	2	0·67	2	1·30	..	..	1	0·50	1	0·30	..	0·7	3	1·50
December ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	16	8·12	15	6·05	26	9·07	40	9·59	18	6·97	..	32·1½	12	5·40
1877.														
January	..	..	..	..	..	..	..	..	..	..	..	..	..	..
February ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
March	1	0·30	..	..	3	1·20	4	1·72	1	0·15	..	0·7½	..	0·65
April	1	0·15	2	0·45	..	..	1	1·02	1	0·05	..	0·½	..	..
May	5	4·59	3	4·28	2	4·42	3	3·76	3	4·64	..	5·7½	..	5·60
June	4	2·07	6	2·19	2	1·69	2	0·87	5	3·25	..	4·3	..	4·32
July	4	0·55	2	0·70	1	0·50	7	1·24	3	0·70	..	1·1½	..	0·77
August	6	2·35	7	2·30	6	2·81	12	2·54	6	2·10	..	3·	..	2·72
September ..	9	6·27	9	5·70	11	12·75	13	8·94	8	10·00	..	9·½	..	8 22
October	11	5·37	9	2·35	..	..	16	7·56	9	5·70	..	6·1	..	1·50
November ..	3	1·20	1	0·40	..	..	2	0·55	2	1·15	..	1·4½	..	0·60
December ..	1	0·10	..	..	..	..	..	..	..	..	..	0·1	..	..
Total ..	45	23·05	39	19·37	25	23·37	60	28·20	38	27·74	..	32·1½	..	24·38
1878.														
January	..	..	..	..	..	..	..	..	..	..	..	..	..	..
February ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
March	..	..	..	..	..	..	..	..	..	..	..	0·4½	..	0·97
April	..	..	..	0·20	..	0·50	..	0·20	..	..	..	1·4	..	0·65
May	..	0·3½	..	·45	..	0·70	..	1·86	..	·6	..	2·4½	..	1·47
June	..	1·9½	..	1·30	..	1·40	..	·17	..	2·40	..	16·7½	..	12·55
July	..	5·8½	..	0·25	..	5·70	..	6·69	..	5·93	..	14·5½	..	6·12
August	..	6·9½	..	4·85	..	5·00	..	7·74	..	6·08	..	10·7½	..	7·35
September ..	..	8·5½	..	0·15	..	6·00	..	6·88	..	3·95	..	5·3½	..	..
October	..	..	..	..	..	..	..	..	..	..	..	..	..	..
November ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Cuddapah,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

Appendix B.

Bugglair River Investigation, Badvel Taluk.

Statement of Tanks above 100 Acres Ayacut

Number.	Latitude.	Longitude.	Drinage Area.	Maximum Flood Discharge from Drainage Area.	Names of Tanks.	Ayacut. Government.	Ayacut. Inam.	Total.	Total Assessment of Ayacut.	Present Condition. Year.	Present Condition. Area.	Lowest Condition. Year.	Lowest Condition. Area.	Average Outturn for 5 Years.	No. of Acres Per Mile of Catchment Basin.	
	° ′	° ′			*Eastern Side.*	Acres.	Acres.	Acres.	Rs.		Acres.		Acres.	Acres.	Acres.	
1	15 11	79 0	98	..	Rajoopalam Racheruvu	527	71	598	6,325	1,284	1,623	1,283	93	5,599	10	
2	15 6	78 59	4	1,115	Kalasapad Chinnacheruvu	152	76	228	2,852	1,282	201	1,283	148	1,751	42	
3	15 4	79 1	2	753	Penchimarry or Kalagondapaly tank ..	74	39	113	1,360	1,284	134	1,285	98	831	36	
4	15 4	79 3	5	1,503	Sankaramal Chintapaly tank ..	80	61	141	1,512	1,282	163	1,284	115	735	29	
5	15 1	79 4	91	..	Poramamilla tank	1,793	1,295	3,088	21,289	1,284	2,020	1,283	2,519	11,361	33	
6	14 56	79 4	4½	1,091	Kowlacondla Cottamuta	72	69	141	1,461	1,284	157	1,283	102	600	31	
7	15 2	79 5	3	1,026	Cherlapaly Munalacheruvu ..	107	47	154	1,602	1,283	113	1,283	114	871	51	
8	14 59	79 3	6	1,029	Ranganaudavum tank	157	45	202	1,500	1,285	216	1,283	154	1,259	67	
9	14 55	78 59	4	1,416	Govindayapaly tank	94	28	122	1,330	1,283	149	1,282	100	1,025	39	
10	14 56	79 1	10	2,819	Mamidy tank	81	44	125	1,307	1,285	221	1,284	128	1,127	12	
11	14 58	79 2	15	2,910	Kodur tank	41	69	110	1,171	1,284	110	1,285	102	775	7	
			141½			2,677	1,776	4,453	39,909	..	5,163	..	3,731	28,637	..	
12	14 47	79 4	24	1,152	Pudduvad Peruvanti tank ..	107	132	239	2,695	1,284	211	1,285	148	1,257	67	
13	14 46	79 5	2	766	Pitirajapaly Cheruvuru	51	31	82	1,264	1,284	102	1,285	89	415	52	
14	14 45	79 4	3	849	Tungalapaly tank	169	152	321	3,866	1,284	1,283	..	..	153	160	
15	14 43	79 5	13	2,039	Chennampaly tank	277	665	942	6,177	1,282	837	1,283	574	3,536	91	
16	14 51	79 4	4½	1,305	Sidavaram tank	72	69	141	1,461	1,284	157	1,285	152	1,074	31	
17	14 54	79 5	3	1,026	Ishagaripaly tank	67	47	114	1,241	1,284	127	1,282	94	724	31	
18	14 50	79 7	6	1,424	Gurramgunta Nuzuldheruvu ..	65	47	194	928	1,281	127	1,282	91	873	17	
19	14 48	79 6	3	912	Kunnapaly Mukal tipaly tank ..	66	37	103	1,018	1,284	124	1,281	91	575	41	
20	14 46	79 7	87	..	Tadvel large tank	69	54	123	752	1,285	96	1,283	81	575	26	
21	14 44	79 8	3	..	Do. Racheruvu	1,527	1,583	3,110	23,192	1,283	2,752	1,282	2,525	17,005	123	
22	14 52	79 7	11	..	Gudiganuvur tank	164	206	370	2,339	1,285	416	1,283	304	2,016	22	
23	14 55	79 8	4	..	Cheruvukuruva	223	24	247	3,524	1,284	80	1,281	71	849	31	
..	..	..	3	..	Tadavapaly tank	99	28	127	951	1,285	131	1,283	87	593	42	
			142			3,899	3,603	6,647	54,455	..	5,363	..	4,591	29,903	..	
	° ′	° ′			*Circar Tanks below 100 Acres Ayacut.*											
33	..	..	78½	21,366	Tanks	711	478	1,189	9,750	..	1,248	..	955	6,560	15	Approximate.
					Shotriem Tanks and Dasamandam.											
22	..	..	27½	11,615	Tanks	380	267	647	5,007	..	601	..	..	3,360	23	Do.
5	..	..	4	1,882	*Private*—Tanks	..	..	13,334	99,263	..	7,118	..	5,519	68,589	..	
					Western Side.											
24	15 3	78 58	4	.	Gungana paly	110	52	162	1,253	1,284	117	1,283	83	978	40	
25	14 41	79 5	29	..	Konasamudram tank	316	130	446	5,696	1,285	452	1,281	266	2,858	11	
26	14 47	79 56	1	569	Junganrazpoly	16	4	20	79	1,285	10	1,285	6	27	20	
27	14 49	78 58	10	2,810	Somireddipaly Racheruvu ..	..	..	..	..	1,282	29	1,285	..	74	..	Out of repair.
			44			442	186	628	7,028	..	608	..	355	3,932	..	
					Toomalaru Valley (Badvel Taluk.)											
1	14 43	79 11	4	..	Gopavaram tank	79	115	194	1,153	1,284	262	1,283	188	1,266	48	
2	14 40	79 11	2	..	Do. Bathayapaly tank ..	80	50	130	1,060	1,284	140	1,281	100	782	65	
					Toomalaru Valley (Sidhout Taluk) above Acres 100 Ayacut.											
3	14 41	79 12	1	450	Ramapooram Bedsoopalycunta ..	64	77	141	642	1,286	72	1,283	71	398	..	
4	14 37	79 13	..	..	Do. Chinnacheruvu Peddacheruvu.	71	46	117	875	1,286	121	1,282	83	1,042	..	
5	14 36	79 13	2½	915	Bramhanapaly Pathacheruvu ..	78	26	104	969	1,282	102	1,286	67	617	..	
6	14 35	79 13	3	1,140	Do. Kottacheruvu											
7	14 35	79 14	6	1,532	Do. Cusbah tank	98	110	206	725	1,284	116	1,286	17	495	..	
8	14 30	79 15	..	..	Yeprala Peddacheruvu	120	51	171	1,659	1,284	122	1,285	110	886	..	
9	14 34	79 14	1	450	Bordicherla Davarazcunta ..	105	25	130	1,077	1,285	117	1,286	117	639	..	
			19½			693	503	1,196	8,160	..	1,052	..	753	6,125	..	
23	..	..	..	..	*Under 100 acres Ayacut*—Tanks ..	790	232	1,022	7,797	..	826	..	664	5,446	..	
4	..	..	..	..	*Dasamandam and Shrotriem*—Tanks ..	432	212	644	5,431	..	683	..	596	..	..	
3	..	..	..	..	*Private*—Tanks	..	..	..	..	..	..	..	..	..	..	

Cuddapah,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

Appendix C.

Level of Water in Badvel and Porumamilla Tanks below the Crest of Calingula.

Months.	1873.		1874.		1875.		1876.		1877.		1878.	
	Badvel.	Porumamilla.	Badvel.	Porumamilla.	Badvel.	Porumamilla.	Badvel.	Porumamilla.	Badvel.	Porumamilla.	Badvel.	Porumamilla.
January	Tank quite full.	2 months' supply	Tank about ¼ full.	3 months' supply	3½ feet below.	4 feet below.	No water.	No water.	No water.	No water.	16 feet below.	11 feet below.
February	Do. ..	1 month's „	Tank half full..	2 „ „	6·75 feet below.	6½ feet below.	Do. ..	Do. ..	Do. ..	Do. ..	18 feet below.	12 feet below.
March	Water in the tank about 1½ yard below crest.	No water in the tank.	Do. ..	15 days' water..	..	..	Do. ..	Do. ..	Do. ..	Do. ..	21 feet below.	15 feet below.
April	Water in the tank one yard below crest.	Do. ..	Do. ..	10 „ „ ..	9 feet below.	10 feet below.	Do. ..	Do. ..	Do. ..	Do. ..	26 feet below.	Almost dry.
May	6 months' water.	Do. ..	Tank nearly full.	1 month's supply	15 feet below.	14 feet below.	29½ below crest.	Do. ..	22½ feet below.	16½ feet below.	26 feet below.	12·75 feet below.
June	5 „ „ ..	Do. ..	Tank half full..	2 months' „	18 feet below.	13 feet below.	No water in the tank.	Do. ..	23 feet below.	11 feet below.	Almost dry.	Almost dry.
July	3 „ „ ..	Do. ..	Do. ..	Do. ..	Do. ..	Do. ..	Do. ..	Do. ..	Do. ..	11 feet below.	23 feet below.	12 feet below.
August	3 „ „ ..	2 months' water.	24 feet below ..	7½ feet below ..	13½ feet below.	11½ feet below.	24 feet below crest.	16 feet below.	21 feet below.	Only 2 days' water	22 feet below.	10 feet below.
September	2½ „ „ ..	20 days' „	2½ „ ..	This is the first time the tank has filled for the last 15 years.	19 feet below.	25 feet below.	No water in the tank.	No water	16 feet below.	9 feet below.	12 feet below.	..
October	Tank full ..	6 months' „	2 feet above ..	1 foot above ..	21 feet below.	27 feet below.	Do. ..	No water in the tank.	9 feet below.	6 feet below.	..	..
November	Tank is full ..	8 „ „	6 inches below.	2 feet below ..	No water.	No water.	Do. ..	Do. ..	10 feet below.	7 feet below.	..	..
December	Nearly full ..	6 „ „	1 foot below ..	3 „ ..	Do. ..	Do. ..	Do. ..	Do. ..	13 feet below.	9 feet below.	..	..

As no gauges are put up in the tanks this statement is only an approximation.

Cuddapah,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

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Appendix D.

Sugglair River Investigation, Sidhout Taluk.

Statement of Tanks above 100 Acres Ayacut.

Number.	Latitude.	Longitude.	Drainage Area.	Maximum Flood Discharge from Drainage.	Names of Tanks.	Ayacut. Government.	Ayacut. Inam.	Ayacut. Total.	Total Assessment of Ayacut.	Highest Cultivation. Year.	Highest Cultivation. Acres.	Lowest Cultivation. Year.	Lowest Cultivation. Area.	Average Cultivation for 6 Years from 1231 to 1236.	No. of Acres per Mile of Catchment Basin.
	° ′	° ′			*Eastern Side.*	ACRES.	ACRES.	ACRES.	RS.		ACRES.		ACRES.	ACRES.	ACRES.
1	14 39	79 8	..	..	Kamalakoor Pelacheruvu	225	100	325	2,649	1,282	413	1,286	215	1,255	..
2	14 37	79 8	..	..	Madupoor Nalacoonta	239	83	322	1,684	1,284	280	1,286	111	1,201	..
3	14 35	79 9	..	..	Kamasamudram Pedacheruvu ..	90	61	151	1,722	1,284	130	1,286	93	1,356	..
4	14 34	79 9	..	..	Ramaloor Kottacheruvu	78	21	109	933	1,284	120	1,283	99	662	..
5	14 37	79 9	..	..	Madupoor Pedacheruvu	206	97	303	3,750	1,282	289	1,286	196	2,310	..
6	14 33	79 8	..	..	Jounavaram do.	74	60	134	1,581	1,284	144	1,282	131	974	..
					Total ..	912	492	1,404	12,279	..	1,376	..	845	7,659	..
					Circar Tanks below 100 Acres Ayacut.										
8	..	..	..	..	Tanks	121	28	149	946	..	180	..	143	938	..
					Dasawandam and Shrotriem.										
4	..	..	..	..	Tanks	91	41	132	1,572	..	130	..	49	..	..
1	..	..	..	..	*Private*—Tanks	..	..	..	..	..	..	..	..	..	..
					Western Side.										
7	14 41	79 3	..	..	Koombagirisidiram tank	64	46	110	720	1,284	134	1,286	..	618	..
8	14 35	79 7	..	..	Kondoor Kolacunta	85	62	147	1,463	1,284	170	1,286	34	631	..
9	14 34	79 7	..	..	Atloor Kottacheruvu	99	76	175	1,453	1,282	184	1,286	95	1,035	..
10	14 32	79 6	..	..	Waricoonta Pedacheruvu	269	163	432	3,412	1,284	397	1,286	151	2,415	..
11	14 31	79 7	..	..	Thudoor Peddacheruvu	113	66	179	1,719	1,284	95	1,286	26	1,031	..
12	14 30	79 7	..	..	Oppatoor Pedacheruvu	58	57	115	1,614	1,284	80	1,286	79	821	..
					Total ..	688	470	1,158	10,286	..	1,060	..	385	6,594	..
					Circar Tanks below 100 Acres Ayacut.										
15	..	..	..	..	Tanks	212	87	299	1,800	..	682	..	215	2,277	..
					Dasawandam and Shrotrism.										
5	..	..	..	..	Tanks	188	89	277	2,111	..	352	..	213	..	..
3	..	..	..	..	*Private*—Tanks	4	..	4	23	..	4	..	..	..	..

Average Collections.

Ayacut.		RS.
ACRES.		
1,685	..	14,737
1,738	..	13,125
3,423	Total ..	28,222

	RS.
Eastern catchment	8,657
Western do.	8,971
	17,528

(Signed) H. UNWIN,
Executive Engineer.

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Appendix E.

Statement showing the Probable Ayacut if undermentioned Tanks are repaired.

Number.	Name of Tanks.	Name of Villages.	Out of Cultivable Waste Lands.		Out of Lands under Ryots.		Out of Inam Lands.		Total.		Second Crop Assessment.	Probable further Increase after 5 or 6 years.
			Acres.	Assessment.	Acres.	Assessment.	Acres.	Assessment.	Acres.	Assessment.		
				Rs.		Rs.		Rs.		Rs.	Rs.	Acres.
1	Veerapaly tank ...	Ramkonda ..	378	1,134	41	123	77	231	496	1,488	600	100
		Veerapalli ..	10	30	18	54	4	12	32	96	48	32
		Bommanchi ..	125	375	12	36	53	159	192	576	150	100
		Nagaripaly ..	80	240	22	66	16	48	118	354	75	50
		Total ..	593	1,779	93	279	147	441	833	2,514	873	282
2	Somindapaly Reservoir.	Somindapaly ..	19	57	137	685	122	610	269	1,345	..	..

Appendix F.

Statement showing the Land Revenue in the Valley of the Sagglair River, Badvel Taluk.

Name of Villages.	Total Area of Villages.	Area of Hills and Jungle.	Cultivable Waste Lands.		Cultivated including Inams.				Probable Increase in Area if Water is supplied.	Probable Increase in Revenue.
			Dry.	Wet.	Dry.	Assessment.	Wet.	Assessment.		
Western Valleys.	Acres.	Acres.	Acres.	Acres.	Acres.	Rs.	Acres.	Rs.	Acres.	Rs.
Mallavaramalli	3,024	1,152	327	26	93	326	371		20	100
Gopavaram (Agraharam) ..	2,511	1,171	59	..	281	187	..	..	30	150
Peddamudium	600	..	63	18	189	50	33	124	40	200
Pullampet	1,722	..	63	18	189	50	33	124	100	500
Mannoli	1,282	..	69	27	762	505	45	176	200	1,000
Kodur	7,068	779	4,721	46	3,185	1,056	505	4,518	200	1,000
Marripaly (Agraharam) ..	..	103	2,040	50	1,330	1,330	311	2,440	..	..
Ankireddipalle	1,535	..	..	..	..	..	..	..	60	300
Mukkavandlapalli	2,559	..	261	3	203	108	68	133	160	800
Pedakudair	3,150	..	1,373	50	624	271	201	1,031	150	750
Venkatapuram (Agraharam)	..	..	1,407	67	962	649	425	1,951	..	..
Tangedimalli	915	..	421	28	321	50	145	281	50	250
Tenneruvenkatapuram ..	1,528	..	611	100	182	167	633	1,000	200	1,000
Chennarayapalli	5,025	..	1,012	247	439	404	747	2,481	100	500
Indivi	20,677	9,501	5,509	265	1,218	1,365	2,753	14,873	2nd crop	2,000
Kannavaripalli (Agraharam)	..	..	..	..	..	..	..	..	100	500
Nemalapuram	771	..	516	64	91	20	105	413	100	500
Gollavaram	921	..	520	16	153	75	232	610	100	500
Pattayapalli	1,302	..	970	9	135	134	128	1,276	..	..
Total ..	57,171	14,329	23,593	1,022	10,668	6,110	7,422	19,007	1,930	10,000
Western Sub.										
Gurramapalli	8,003	6,643	1,872	..	479	268	..	..	120	600
Indirapalli	1,739	872	482	..	355	133	..	..	40	200
Kothakota	16,373	14,842	2,213	6	1,177	338	35	142	655	3,010
Errava Tandellapalli ..	425	..	80	..	284	457	5	37	97	485
Degava do. ..	401	59	162	2	264	146	3	31	152	720
Siddampalli	493	64	217	..	212	115	..	..	80	460
Pata Errayanam	1,625	..	870	..	131	73	19	221	110	650
Sellampalli	534	..	611	2	316	169	5	50	80	400
Vayalur	2,535	..	2,161	3	845	322	..	..	200	1,000
Narasapuram	2,000	..	825	32	1,053	1,116	108	570	100	500
Rampad	1,501	..	952	13	271	340	65	197	500	2,500
Kattamanpalle	12,540	..	6,746	69	5,265	1,266	26	802	300	1,500
Savarapalli	14,979	5,239	7,050	..	2,678	1,222	18	89	..	..
Venkatari (Agraharam) ..	..	..	..	..	..	..	..	..	..	..
Nelamanur	6,465	..	2,005	21	1,220	736	165	661	120	600
Palagirallapalli	12,168	..	10,864	135	1,304	1,582	285	527	400	2,000
Chinnakkavarayam (Agraharam)	..	..	..	..	..	..	..	..	..	..
Peyanapalli (Agraharam) ..	..	..	..	..	..	..	..	..	..	..
Gollavaram	1,926	59	1,107	11	694	360	75	188	100	500
Gundapuram	1,615	214	866	19	458	400	39	254	80	400
Degavarakatur	4,377	1,311	2,589	29	427	338	211	752	100	500
Dadavada	124	..	21	..	59	115	14	33	15	75
Pariharavada	5,582	..	4,475	84	1,191	552	159	797	150	750
Nandavaram	1,331	..	1,503	5	398	109	123	571	75	375
Vanampalle	4,323	..	2,921	50	1,054	314	109	477	120	600
Konnasamudram	954	..	60	25	489	397	269	1,553	50	300
Kongadevel	2,182	250	1,193	53	606	322	60	463	100	500
Total ..	105,381	29,494	52,243	540	21,200	11,994	11,782	8,632	3,871	18,965

Badvel,
4th November 1878.

(Signed) P. DHOND ROW,
Tahsildar of Badvel.

Cuddapah,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

Appendix G.

Statement of Probable Increase in Irrigation if Supply Channel is made to Porumamilla Tank.

Village Name.	Total Area in Acres.	Jungle and Waste lands.	Dry Cultivation.	Wet Cultivation.	Present Water-supply.	Is it sufficient?	Probable Increase in Circar Lands.										Probable Increase in Inam Lands.								Grand Total.	
							From Waste Lands.			From Dry Cultivation.			Wet Lands used for Dry on account of scarcity of Water.			Extra Revenue from existing Wet Cultivation.	Dry Cultivation brought for Wet.			Second Crop.			Extra Revenue.			
							Acres.	Assessment.	Second Crop Assessment.	Acres.	Assessment.	Second Crop Assessment.	Acres.	Assessment.	Second Crop Assessment.	Water Rent.	Acres.	Assessment.	Second Crop Assessment.	Acres.	Second Crop Assessment.		Acres.	Water Rent.		Acres.	Assessment.
								Rs.	Rs.		Rs.	Rs.		Rs.	Rs.	Rs.		Rs.	Rs.		Rs.			Rs.		Rs.
Porumamilla Group.																										
Aravapaly	749	694	55	..	Porumamilla tank.	No	95	525	263	50	250	120	..	..	..	..	10	30	20	..	..	..	155	1,207		
Damamapaly	368	30	14	324	Do. ..	,,	20	80	40	..	..	..	30	300	150	..	..	..	..	50	150	..	100	720		
Narasingapaly	232	60	172	..	Do. ..	,,	12	60	30	30	150	80	..	..	..	..	..	..	..	..	..	..	52	360		
Rungasamudram	1,446	530	400	216	Do. ..	,,	50	150	75	40	200	102	70	300	150	20	60	10	20	20	60	180	..	..	410	2,060
Gurrapagaripaly	1,160	560	610	50	Do. ..	,,	10	35	17	..	..	..	30	200	100	..	..	..	..	50	150	..	..	..	90	502
Soonkasolapaly	238	30	..	208	Do. ..	,,	80	400	200	180	740	370	360	2,250	1,000	60	180	30	90	60	740	2,525	30	90	1,480	9,455
Porumamilla	5,662	1,854	2,072	1,736	Do. ..	,,	297	1,400	669	500	2,155	997	500	4,000	2,020	100	300	50	150	100	500	3,005	30	90	2,377	14,956
Present Revenue ..	9,853	3,968	3,323	2,582	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
	..	..	1,555	15,156	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Sankavaram Group.																										
Kammavaripaly	306	123	167	6	Kalasapaud tank.	No	63	210	60	113	338	150	6	..	26	10	30	67	201	98	6	30	..	..	265	1,172
Nalagondapaly	274	136	103	35	Tank	,,	112	415	160	61	183	90	31	..	142	5	15	5	15	7	15	165	232	1,135		
Mudvaripaly	709	388	217	95	Porumamilla ..	,,	200	200	120	80	240	120	30	130	65	50	150	20	60	30	25	80	20	60	425	1,255
Balijapaly	279	142	82	54	Do. ..	,,	120	120	60	54	162	81	10	45	23	80	240	40	120	60	10	30	10	30	324	971
Tamalalapaly	152	62	60	30	Do. ..	,,	25	48	24	25	75	378	14	86	28	30	55	..	..	..	10	35	..	..	94	731
Gooden	166	26	89	50	Do. ..	,,	20	60	30	80	240	120	20	160	80	30	90	30	90	30	10	50	5	15	195	965
Kattakindapaly	540	229	200	111	Do. ..	,,	100	350	140	120	360	180	55	350	175	120	360	50	150	75	50	250	20	60	515	2,460
Chintalapaly	733	366	230	137	Tank	,,	87	300	150	150	461	230	66	350	175	100	300	90	420	211	90	450	30	91	613	3,138
Jativartypaly	208	29	117	62	Porumamilla ..	,,	20	70	35	100	300	150	17	102	51	100	300	25	75	38	..	..	10	30	272	1,151
Lingareddypaly	475	34	403	38	Akisidupaly tank.	,,	10	30	15	18	54	27	10	65	38	80	240	30	90	46	4	32	10	30	162	666
Pidugupaly	505	251	220	34	Tank	,,	80	240	80	80	240	120	10	65	33	40	120	10	30	15	5	25	3	9	228	977
Akisidoopaly	547	273	220	54	Do. ..	,,	100	300	150	80	240	120	25	150	75	50	150	20	60	30	10	40	10	30	295	1,345
Sankavaram	7,731	6,375	1,009	347	Porumamilla ..	,,	494	1,818	956	1,039	3,107	594	53	427	88	315	946	188	190	361	65	491	262	605	2,416	9,681
Present Revenue ..	12,616	8,445	3,108	1,063	..	..	1,431	4,200	2,000	2,000	6,000	2,360	350	2,000	1,000	1,000	3,001	575	1,501	1,000	500	1,618	380	960	6,036	25,610
	..	..	1,494	6,819	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Kalasapaud	2,834	1,962	811	58	Tank	No	10	30	15	..	..	..	..	60	540	200	..	..	..	..	..	..	20	100	..	..	10	45
Amavaripaly	167	12	52	103	Do. ..	,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	30	840
Present Revenue ..	3,001	1,974	863	161	..	..	10	30	15	..	..	..	..	60	540	200	..	..	..	..	..	..	20	100	..	..	90	885
	..	..	1,826	1,850	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Mamilapaly	2,623	2,332	242	49	Kalasapaud tank.	No	20	80	40	50	200	100	..	..	..	40	120	10	30	30	10	40	4	12	134	652
Mahanandipaly	865	151	663	51	Do. ..	,,	10	50	25	20	100	60	10	50	25	4	12	10	30	30	6	20	3	9	63	401
Vobalapuram	1,235	948	226	61	Tank	,,	..	..	..	10	41	20	20	180	90	..	..	..	..	..	16	72	..	..	46	402
Pendlimarry	812	329	420	63	Do. ..	,,	30	120	60	10	41	20	..	..	..	..	..	20	60	42	..	..	..	..	60	342
Mussalreddypaly	679	283	352	14	Do. ..	,,	20	100	50	30	154	75	..	..	..	17	51	6	15	15	20	80	..	..	92	536
Pacharedypaly	517	162	155	200	Do. ..	,,	30	150	50	30	122	60	..	..	..	20	60	10	30	30	40	100	4	12	134	612
Rajeepalem	2,400	1,702	269	429	Racheroovoo ..	,,	..	..	..	..	..	..	..	..	..	20	60	..	..	..	20	60	..	..	40	120
Shrotriem Bramhanapaly	246	..	108	138	Do. ..	,,	..	..	..	..	..	..	..	..	..	20	60	20	60	35	..	..	..	..	40	155
Do. Marakapur ..	271	93	132	40	Tank	,,	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Present Revenue ..	9,668	6,006	2,627	1,035	..	..	110	500	225	160	668	342	45	330	165	121	363	76	228	183	122	387	11	33	645	3,441
	..	..	4,557	5,907	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Grand Total ..	35,138	20,393	9,224	4,821	..	..	1,818	6,130	2,909	2,660	8,843	3,699	955	6,930	3,395	1,221	3,664	701	1,879	1,283	1,342	5,110	421	1,083	9,148	44,922
Present Revenue ..	..	..	23,432	28,732	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Deduct the Revenue now received for Dry Cultivation.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	6,930
Probable Increase in Revenue, say 30,000 Rupees.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	37,992

(Signed) A. G. ATKINSON,
Acting Sub-Collector, Cuddapah.

Appendix H.

Statement of Probable Increase in Wet Cultivation in the Sagglair Valley, Sidhout Taluk.

Number.	Name of Villages.	Total Area of the Village.	Area of Hills and Jungle.	Cultivable Waste Lands		Cultivated including Inams.				Probable Increase if Water is supplied.	Probable Increase in Revenue.
						Dry.		Wet.			
				Dry.	Wet.	Acres.	Assessment.	Acres.	Assessment.		
	Eastern Side.	Acres.	Acres.	Acres.	Acres.		Rs.		Rs.	Acres.	Rs.
1	Kamalakoor	4,662	1,990	1,450	32	308	236	882	3,766	200	600
2	Madupoor	7,161	5,398	200	50	409	550	844	5,418	98	294
3	Kamasamudram	2,825	1,740	581	12	395	132	98	565	54	162
4	Vamaloor	835	160	120	30	335	609	150	1,420	15	45
5	Muthucoor	5,074	4,590	60	..	95	1,523	329	2,674	40	120
6	Pedatalapapayapaly (Agraharam)	..	..	..	..	..	..	..	..	..	..
7	Jonnavaram	4,661	3,464	50	..	328	610	219	1,700	50	90
8	Rungampaly	1,331	1,141	10	..	156	258	24	108	10	30
9	Malampatnum	6,241	4,637	60	..	1,369	2,731	175	919	600	1,800
	Total ..	32,191	23,320	2,531	124	3,455	6,558	2,761	16,570	1,017	3,141
	Western Side.										
10	Tipanapaly	2,380	1,581	390	32	275	153	82	405	150	450
11	Venkatachettypaly	1,519	..	1,350	5	78	77	56	550	20	60
12	Rajoopalem	2,353	1,583	452	..	285	325	33	154	400	1,200
13	Yerrapaly	2,503	1,620	360	..	545	372	78	392	200	600
14	Tennatallagondi	5,758	4,910	400	..	714	778	14	70	100	300
15	Gajjulavaripaly	1,725	1,160	30	20	385	465	121	676	100	300
16	Koombagiri	688	21	120	60	347	595	140	936	100	300
17	Kondoor	6,944	5,696	461	..	565	547	282	2,068	600	1,800
18	Atloor	7,258	5,746	30	2	1,074	1,470	406	3,177	150	450
19	Varicoonta	4,758	3,951	40	..	373	538	481	3,259	50	150
20	Viroor	2,022	1,175	30	..	755	1,453	62	462	20	60
21	Mathur	2,068	1,564	57	..	360	1,291	147	845	10	30
22	Tudoor	2,101	1,627	2	1	199	300	271	1,890	20	60
23	Voopatoor	3,810	1,586	795	243	712	192	274	1,803	200	600
24	Chendrovagu	4,562	2,563	29	..	896	1,261	89	297	400	1,200
	Total ..	60,159	35,362	4,507	363	7,188	9,727	2,539	16,984	2,520	7,560

26th October 1878.

(Signed) H. RAMIAH, Tahsildar.

Cuddapah,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

Appendix J.

Statement showing the Probable Ayacut under a Proposed New Reservoir at Kottacota near Kalasapaud.

Name of Tank.	Name of Villages.	Out of Cultivable Waste Lands.		Out of Lands under Ryots.		Out of Inam Lands.		Total.		Second Crop Assessment.	Probable further Increase after 5 or 6 years.
		Acres.	Assessment.	Acres.	Assessment.	Acres.	Assessment.	Acres.	Assessment.		
			Rs.		Rs.		Rs.		Rs.	Rs.	Acres.
New tank at Kottacota.	Deguva Tumballapaly ..	10	50	125	500	54	170	189	720	405	1,125
	Kottacota ..	112	560	436	2,180	90	270	638	3,010	425	3,485
	Eguva Tumbalapaly ..	12	60	75	375	10	50	97	485	114	599
	Potha Ramapuram ..	40	200	60	360	10	50	110	550	150	700
	Sengarayapaly ..	10	50	50	250	20	100	80	400	100	500
	Total ..	184	920	746	3,665	184	640	1,114	5,165	1,194	6,359

Note by the Executive Engineer.—An immediate return may be expected by .. .. Acres. 1,114 Rs. 5,165
And further increase after 5 or 6 years 6,359 28,615

Grand Total .. 7,493 33,780

Badvel,
4th November 1878.

(Signed) P. DHOND ROW.
Tahsildar of Badvel.

Cuddapah,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

Appendix K.

We, the curnams, reddies, and ryots of the villages named Bramhanapaly, Singarayapaly Rajoopalem, and Pullaredypaly, beg to bring to your benign consideration the following few lines:—

We all consent for having a supply channel to feed Porumamilla and Badvel large tanks. A new line has been marked out across the good fields in 1868-69, while there is an old channel made in the time of Nabobs. We all think if a channel be placed along the new line marked out there is a great loss to the ryots and also to the Government. This information can be procured from Law Agent, Shrotriemdar, Native Doctor Kristnamoorty Rao (Bramhanapaly).

If the Government consent to have the new line of channel they will have to pay the cost of all shrotriem, circar and inam, and also to all the wet lands across the new line. If they consent even for that we cannot get such lands; by this there will be a loss to the ryots, inamdars, and also to the Government by purchasing land for channel, the loss of assessment for same and also incurring at the cost of preparing a new channel.

If the old channel be fixed upon there is a profit to the ryots, inamdars, and to the Government (that is)—

The bund is only demolished in some parts, but not the whole. The mud in the channel can easily be taken out as it was filled only by the rain. The mud so dug be placed at the bund where washed away, then the channel can easily be made out. There is a revetment stone very near to this place to build on both sides of the bund. Therefore the cost of the old channel will be lower than that of the new. The dry cultivated lands of our villages under this old channel can also be assessed for water rent. By this there is a profit to the Government. Instead of losing our lands if we have water from the old channel we can cultivate the dry lands as wet cultivation; by this all shrotriem, inamdars and ryots will gain profit.

If the old anicut be preferred then all right, if not the level of the old and new channels where they meet is same. The new channel is not so high as the old channel. It joins the old channel very easily. Therefore we all request your honor to prefer the old channel instead of the new line of channel which is a great loss to the Government and to the ryots too.

On both sides of the old channel there are cultivated lands; near the new anicut and to the north of the new line at 20 chains length there are waste lands and hills. We thought that you will presume that the stones and mud washed out from the hills by the rain will fill the channel. In these 20 chains length if a side channel is placed then there is no danger to the old channel. The cost of the side channel would be very easy. We beg your honor to prefer only the old channel, but not the new one.

(Signed) KRISTNAMOORTY RAO, Native Doctor,
and some eight others.

We, the petitioners of Kottacota village, curnams, reddies, and ryots, beg to bring to your kind notice the following few lines:—

In taking supply from the Sagglair river to Porumamilla, Badvel large tanks, the Circar rejected the old channel and selected a new line at Tumbalapaly which is a mile off below the old anicut. We cannot find such hard ground for the foundation at Tumbalapaly as at the old anicut. The Law Agent, Shrotriemdar, Native Doctor Kristnamoorty Rao can show the old anicut and state of the foundation there. If the old anicut be fixed upon and repaired the old channel there with 100 acres of land can pay wet assessment

We all request to have old channel and old anicut in progress.

There are some remains of the bund along old channel, but 3 or 4 chains distance the bund has been washed away at half a mile below the old anicut. If a cutting of 3 or 4 chains long be made where the channel runs through an elevated ground and the rest of the bund repaired where washed away the channel will be found in good state. Therefore we all request the old anicut be fixed upon; then the ryots and Government will gain by it.

(Signed) B. VENGANNAH,
and five others.

(Signed) H. UNWIN,
Executive Engineer.

Appendix L.

Sagglair River Investigation.

Approximate Contents of Cutting between Perumamilla and Sidhavaram Tanks, Base 15 Feet, Slopes 1-1.

—	Distance, Length.	Mean Depth.	Area.	Contents.	Deduct top lift 6 feet deep.	Area.	Contents.	—
	FT.	FT.	FT.	C. FT.		FT.	C. FT.	
	1,800	3	54	97,200		FT.	97,200	
	1,100	4	76	83,600		...	83,600	
	1,600	8	164	204,400		150	24,000	
	1,050	10	250	262,500		174	182,700	
	1,500	12	324	486,000		198	297,000	
	950	13	364	345,800		210	199,500	
	850	17	544	462,400		258	219,300	
	1,100	21	756	831,600		306	336,600	
	700	24	936	655,200		342	239,400	
	1,350	28	1,204	1,625,400		390	526,500	
	1,550	26	1,086	2,136,300		366	567,300	
	1,050	26	1,086	2,136,300		306	384,300	
	2,370	20	700	1,659,000		294	696,780	
	3,696	16	496	1,833,216		246	909,216	
	900	12	324	291,600		198	178,200	
	1,600	6	126	201,600		126	201,600	
				13,402,116			5,143,196	
			C. yds.	496,374				
				190,488		C. yds.	190,488	
				305,886				

Abstract Estimate.

Contents.	Particulars.	Rate.	Per	Amount.	Total.
		RS. A. P.		RS.	RS.
190,488	Cubic yards of earthwork in top lift.	0 1 6	C. yard.	17,854	
305,886	,, in shale rock ...	0 6 0	,,	1,14,787	
				1,32,641	
	Contingencies at 5 per cent. ...	...	...	6,632	
				1,39,273	
	Masonry and other works ...	...	...	10,727	
				1,50,000	1,50,000

Cuddapah,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

Appendix M.

Estimate of the probable cost of completing plans and submitting estimates for the reconstruction of the Ramachendra Kalwa to convey water from the Sagglair River to Porumamilla Tank.

	RS.
One surveyor for three months, at Rupees 100 per month	300
Six kalasies, at 7 Rupees each for three months	126
Jungle cutting, survey flags and pegs, &c.	50
One draftsman for three months, at Rupees 60	180
	656
Sundries at 5 per cent. ...	32
Total ...	688

Note.—As Mr. Dady, Overseer at Pullumpet, prepared the original plans he should, if possible, be employed to complete them, and the cost of one surveyor may then be struck out from this estimate.

Cuddapah,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer,
on Special Duty Sagglair River Investigation.

SAGGLAIR RIVER PROJECT.

Name of Village.	Hamlets.	Total Area in Acres.	Jungle and Waste.	Cultivated.		Nature of Water-supply?	Is it sufficient.	Promised Increase in Number of Acres, Wet Cultivation if Water available.		Probable Assessment.	Remarks on the Water-supply and present Cropping raised, probable Increase, source of Information.
				Dry.	Wet.			Government.	Inam.		
		A. C.	A. C.	A. C.						Rs. A. P.	
Brahmanapalli ..	Nallagatla ..	1,733 3	480 23	1,257 40		Kottakaliva of Saggalair.	Yes	150	50	638 10 0	
Gridhaleru ..	....	4,969 39	3,193 58	1,487 13		Saggalair Tanks	Not	100	100	800 0 0	
Kristnamsettipalli ..	Akkalareddipalli Papireddi-palli.	3,153 7	2,259 70	786 10		..	..	10	10	25 0 0	
					110·27			..	..	..	
Sanjevarayapeta ..	1 Dandolupalli ..	} 3,330 73	2,687 30	685 5	18·36	Tank	Yes	100	100	200 0 0	
	1 Ankireddipalli ..										
	1 Dudimanupalli ..				52·07						
Vuyyalavada ..	1 Narsapalli ..	} 3,941 51	2,000 12	1,785 74		Tank	Not	300	250	650 0 0	
	1 Singampalli ..				5·78	Saggalair	..	..	..	..	
	1 Lingapuram ..				63·75						
					6·69						
Gudikota ..	1 Lakshmipuram ..	} 4,048 88	3,416 82	630 41	25·72	Tank	Yes	100	100	400 0 0	
	1 Vengalampalli ..				128·81	Saggalair Tank	..	..	..	..	
	1 Ramapuram ..				23·41			50	50	200 0 0	
Mundlapadu ..	1 Baruvupalli ..	} 7,021 20	5,078 41	1,636 82	24·39	Vennumlier Wells	Yes Not	100	100	400 0 0	
					10·25						
	1 Venkatapuram ..				27·98	Vennumlier	..	100	100	800 0 0	
Kottakota ..	Tallapalli ..	2,665 51	2,204 78	460 46							
Kommacur ..	1 Vemulapad ..	} 2,180 60	1,493 51	686 1				1,050	860	4,013 10 0	
	1 Narasimhapuram ..										

No. 1,699.

FORWARDED to the Executive Engineer on special duty Saggalair Project with reference to this office docket, No. 1,595, dated 22nd November 1878.

(Signed) G. W. FAWCETT,
Acting Head Assistant Collector.

CUMBUM,
10th December 1878.

FORWARDED to Superintending Engineer, Second Circle, in continuation of this office No. 1,033, of 23rd November 1878.

(Signed) H. LYON,
Executive Engineer, C. D.

18th December 1878.

Statement showing the Area of Hills and Jungles, Dry and Wet Cultivation, Cultivable Wastes, and Village Sites in the several Villages lying in the Valley of the Jummalur in the Taluk of Sidhout, Cuddapah District.

Taluk Map Number.	Names of Villages.	Total Area of Village.	Area of Hills and Jungles.	Cultivation including Inams.		Cultivable Waste Lands.		Village Area of Sites.
				Dry.	Wet.	Dry.	Wet.	
		A. C.	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.
9	Ramapuram	14,431 32	10,016 16	724 52	1,109 53	605 50	38 25	71 20
10	Brammanapalle	5,352 93	4,501 44	358 18	294 74	276 10	10 14	13 76
19	Bodducherla	3,943 19	3,325 44	166 82	221 12	95 6	20 20	10 80
20	Viswanadhapuram (Agraharam)	...	...	...	...	...	...	...
25	Vobalam	16,789 36	12,961 76	1,745 94	412 41	781 6	5 27	66 75
18	Rokallajunta	4,609 86	3,725 23	194 20	166 46	211 46	..	11 16
31	Bakkayapalle	1,178 82	611 84	178 83	106 25	49 45	..	6 70
33	Ravalakolla	2,666 93	1,834 56	313 79	51 54	165 9	..	21 42
35	Yappirala	6,261 79	4,239 36	619 63	212 75	312 13	6 50	22 6
36	Jaovalapalle	4,528 43	3,253 56	390 56	..	256 72	..	13 77

The figures entered in the column "Area of Hills and Jungles" represent the Traverse Areas.

Statement showing the Area of Hills and Jungles, Dry and Wet Cultivation, Cultivable Wastes, and the Village Sites in the several Villages in the Taluk of Badvel of Cuddapah District not entered in the List sent on the 23rd September 1878 with Demi-official letter.

Taluk Map Number.	Names of Villages.	Total Area of Village.	Area of Hills and Jungles.	Cultivation including Inams.		Cultivable Waste Lands.		Village Area of Sites.
				Dry.	Wet.	Dry.	Wet.	
		A. C.	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.
1	Chennapalle	3,962 10	2,194 32	391 61	..	47 41	..	4 56
5	Rajupalem	2,400 13	1,555 62	193 74	440 74	23 46	13 69	4 94
13	Mamillapalle	2,822 97	2,102 40	342 30	48 84	69 11	1 72	3 39
17	Ayyavaripalle (Agraharam)	...	...	...	...	...	...	...
18	Tadapad	9,883 32	5,222 40	885 72	61 81	848 64	14 32	10 46
19	Dulamvaripalle	451 32	...	127 60	63 6	217 33	..	3 49
20	Kondapeta	2,273 23	302 8	514 91	93 47	465 19	5 42	1 52
27	Balayapalle	10,970 91	7,090 55	1,018 12	180 22	762 81	0 51	8 63
28	Varikunta	11,386 90	8,096 0	1,611 59	..	747 56	..	23 20
29	Mulapalle	1,677 62	..	1,332 8	33 3	91 27	..	4 97
30	Gunganapalle	1,226 6	..	216 50	97 45	121 76	1 55	8 56
31	Gontuvaripalle	720 34	..	403 33	83 5	80 19	1 85	8 11
32	Vasudevapuram (Agraharam)	..	..	..	..	..	..	..
36	Vengalampalle (do.) ..	...	...	...	..	...	..	...
37	Noyanipalle	14,546 38	13,657 92	711 8	..	211 50	..	2 31
38	Akkengundla	7,023 65	4,640 48	1,011 16	..	316 30	..	9 31
42	Pagadalapalle (Agraharam)	...	...	...	...	...	..	...
43	Bigundalapad	17,503 58	8,673 69	4,018 65	108 49	1,196 63	..	22 9
44	Akkampeta (Agraharam) ..	...	...	...	..	...	..	...
45	Mattepalle	3,196 10	628 45	709 53	..	165 48	..	30 67
46	Papireddipalle	4,283 76	1,923 20	955 6	..	273 17	..	7 15
48	Sommireddipalle	12,074 88	4,669 44	3,328 30	103 36	1,320 49	..	33 12
49	Jangumrazupalle	11,069 23	6,424 32	2,566 37	65 79	509 31	14 84	47 20
50	Regulakunta	19,312 7	15,081 28	2,149 76	23 64	547 10	..	35 92
51	Darbhavari (Agraharam) ..	..	..	..	..	..	..	..
54	Narasimhapuram (do.) ..	...	...	...	..	...	..	...
55	Eguvanclatur	7,765 20	..	498 24	25 5	152 23	2 51	10 55
59	Narasimhapuram (Agraharam)	...	...	...	..	...	..	...
60	Isavadarivaripalle	3,422 53	884 80	127 62	89 5	442 34	3 57	8 14
63	Pedullapalle	1,273 0	234 40	271 32	145 78	99 70	0 66	8 1
64	Narasimhapuram (Agraharam)	..	..	..	..	..	..	..
65	Komakunta (do.) ..	..	..	..	..	..	..	..
67	Vemakunta (do.) ..	..	..	..	..	..	..	..
68	Kotisalle (do.) ..	..	..	..	..	..	..	..
74	Badukondapalle (do.) ..	..	..	..	..	..	..	..
76	Peramanagaripalle (do.) ..	...	...	...	..	...	..	...
78	Boppapuram	1,974 56	99 20	322 39	77 79	224 31	1 24	0 33
79	Chenaareddipalle (Agraharam)	..	..	..	..	..	..	..
81	Marhapuram (do.) ..	..	..	..	..	..	..	..

The figures entered in the column "Area of Hills and Jungles" represent the Traverse Areas.

Statement showing the Area of Hills and Jungles, Dry and Wet Cultivation, &c.—*continued.*

Taluk Map Number.	Names of Villages.	Total Area of Village.	Area of Hills and Jungles.	Cultivation including Inams.		Cultivable Waste Lands.		Area of Village Sites.
				Dry.	Wet.	Dry.	Wet.	
		A. C.	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.
83	Sancherla							
84	Lachempalle (Agraharam) ..	8,301 60	5,183 52	1,372 68	56 20	714 68	..	19 29
85	Siddanakichayapalle (do.) ..	..	..	..	..	..	..	..
86	Musireddipalle (do.) ..	..	..	..	..	..	..	..
87	Konapatipalle (do.) ..	..	..	..	..	..	..	..
88	Kavalakuntla	..	..	..	..	..	..	..
89	Buchampalle (Agraharam) ..	20,235 22	13,318 49	2,793 76	631 92	1,517 67	15 72	34 25
90	Cheriopalle	..	..	..	..	..	..	..
91	Chinnayapalle (Agraharam) ..	8,955 53	4,242 49	1,513 64	475 36	525 33	16 2	31 17
92	Virlapalle (do.) ..	..	..	..	..	..	..	..
93	Siddavaram	..	..	..	..	..	..	..
94	Seshampalle (Agraharam) ..	5,277 46	2,785 69	585 8	139 23	349 61	9 5	21 99
95	Lingampalle (do.) ..	..	..	..	..	..	..	..
96	Seshampalle (do.) ..	..	..	..	..	..	..	..
97	Isallagarrigela	..	..	..	..	..	..	..
98	Yallampalle	7,039 90	4,679 4	723 70	105 51	267 7	1 28	51 56
99	Venkatramapuram (Agraharam)	3,531 50	2,063 4	433 70	129 55	339 15	0 17	..
100	Ravutupalle	..	..	..	..	..	..	..
101	Midyapad (Agraharam) ..	720 26	..	386 87	..	194 67	..	6 58
102	Gangapenta	..	..	..	..	..	..	..
103	Chennakristnapuram (Agraharam.) ..	11,496 74	8,325 41	1,007 37	235 74	615 97	0 53	7 6
104	Lakkavaripalle	..	..	..	..	..	..	..
105	Appajipeta (Agraharam) ..	4,627 25	2,923 52	930 90	118 5	435 87	..	8 9
106	Kalavapalle	..	..	..	..	..	..	..
107	Kondupalle (Agraharam) ..	1,987 8	631 8	559 93	403 69	74 60	4 98	34 71
108	Etirazupalle	..	..	..	..	..	..	..
109	Lingarapalle (Agraharam) ..	2,325 59	164 80	254 63	291 23	37 8	1 62	13 43
109	Tipparazupalle	..	..	..	..	..	..	..
110	Madhavarayunipalle (Agraharam.) ..	774 7	..	185 68	41 25	55 47	2 53	1 90
115	Ramapuram Agraharam ..	..	..	..	..	..	..	..
116	Gopavaram	..	..	..	..	..	..	..
117	Abbusahebupeta (Agraharam) ..	26,236 17	11,656 36	2,929 15	574 74	574 63	12 18	23 65
118	Kottapalle (do.) ..	..	..	..	..	..	..	..
119	Bayyanapalle	..	..	..	..	..	..	..
120	Mchedipuram (Agraharam) ..	418,12	..	169 44	70 80	47 96	1 2	4 1
121	Chintalacheruvu	..	..	..	..	..	..	..
125	Kondugaripalle (Agraharam) ..	1,314 75	223 49	291 54	300 44	83 28	1 70	8 29
129	Gopalapuram (do.) ..	..	..	..	..	..	..	..
130	Virapalle	..	..	..	..	..	..	..
		12,631 87	10,705 92	702 57	103 54	638 37	19 53	24 14

The figures entered in the column "Area of Hills and Jungles" represent the Traverse Areas.

Statement showing the Area of Hills and Jungles, Dry and Wet Cultivation, Cultivable Waste, and Village Sites in the several Villages of the Cumbum Taluk, Kurnool District, lying above the Water-shed of the Perumamilla and Racheravu Tanks of the Badvel Taluk, Cuddapah District.

Taluk Map Number.	Names of Villages.	Total Area of Village.	Area of Hills and Jungles.	Cultivation including Inams.		Cultivable Waste Lands.		Area of Village Sites.
				Dry.	Wet.	Dry.	Wet.	
		A. C.	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.
72	Nallaguntа	2,529 71	654 47	1,268 85	142 54	244 82	0 79	16 97
69	Razupalem	4,084 71	119 0	2,931 35	193 11	695 9	1 22	39 5
73	Idamakalla	6,869 63	2,756 22	2,513 7	224 79	412 79	4 85	42 47
106	Komaravel	2,053 11	185 97	1,913 79	628 11	208 72	55 91	9 57
101	Pullareddipalle	1,678 4	527 82	776 19	152 26	17 17	..	..
102	Chintalapalle	2,717 51	375 68	1,963 39	..	227 82	..	28 87
103	Sarvireddipalle	2,014 33	651 7	885 2	54 52	124 52	1 54	5 83
93	Guntapalle	297 80	..	207 79	..	1 57	..	6 19
116	Reddicherla	5,783 51	915 88	4,420 77	258 65	433 44	3 23	35 55
107	Allinagaram	4,545 17	807 92	2,017 39	75 3	382 72	0 11	27 42

The figures entered in the column "Area of Hills and Jungles" represent the Traverse Areas.

Statement showing the Area of Hills and Jungles, Dry and Wet Cultivation, &c.—*continued.*

Taluk Map Number.	Names of Villages.	Total Area of Village.	Area of Hills and Jungles.	Cultivation including Inams.		Cultivable Waste Lands.		Area of Village Sites.
				Dry.	Wet.	Dry.	Wet.	
	Agraharam.	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.
79	Vennepalle							
93	Singariddepalle							
94	Kristnampalle							
95	Beduapalle	14,037 79	..	..	..	..	..	..
99	Suravaripalle							
97	Mettupalle							
98	Balesepalle							
77	Chadurumorrayyapalle ..	260 88	..	..	..	..	..	..
105	Bramhanapalle	636 60	..	..	..	..	..	..

The figures entered in the column "Areas of Hills and Jungles" represent the Traverse Areas.

(Signed) J. H. M. COX,
Dy. Director of Rev. Settlement.

GOVERNMENT OF MADRAS.

PUBLIC WORKS DEPARTMENT.

14th January 1879, No. 22 I.

Irrigation.

Read the following papers:—

No. 24. From Lieutenant-Colonel H. L. PRENDERGAST, R.E., Superintending Engineer, Second Circle, to the Chief Engineer for Irrigation, dated Bellary, 27th November 1878, No. 469.

In reply to your memorandum, No. 81-C.D., dated 21st instant, I have the honor to report that I have just returned from Kurnool to-day and found a note of the 22nd instant from Mr. Unwin saying that he had sent his report to the Executive Engineer, Cuddapah, for despatch to me.

One report.
Three plans.

2. The report and plans have also come in, and I am forwarding them on to you at once. I am personally not acquainted with the history of the projects at all; and it has been taken up by Mr. Unwin in communication with your office. Mr. Scott's report on the Purnapully Project was addressed to the Chief Engineer, and it appears necessary that I should avoid delay and send on Mr. Unwin's papers without any report of my own.

3. Mr. Unwin mentions in his note that he had been waiting for some time for some information from the Public Works Department from Cumbum and also from the Collector, but that he has now closed his report without it.

Paragraphs 14 and 16 of Report.

4. It would thus appear to me that Mr. Unwin may be permitted to return to his own Presidency.

No. 24-A. From the same Officer, dated Bellary, 23rd December 1878, No. 992.

In continuation of my letter, No. 841, of the 16th instant, I have the honor to forward a statement furnished by the Head Assistant Collector in Kurnool, giving Revenue information relating to the Sugglair Project.

No. 24-B. No. 378 I.

In G.O., No. 342 I, dated 18th April 1878, Mr. Unwin, Executive Engineer, was ordered to be employed on the investigation of the Sugglair in order to determine how its water might best be turned to account.

2. Mr. Unwin apparently spent some time in tracing the work done and proposals made in past years, and in the end of July 1878 submitted a preliminary report on the subject. Instructions were then given him by the Chief Engineer for Irrigation regarding further steps to be taken, and, acting upon these, he has now submitted a report after personal examination of the river.

3. The conclusions arrived at by Mr. Unwin are —

(1.) That there is an ample area of land available for a large increase in wet cultivation.

(2.) That there is a sufficient supply of water if it is properly applied.

(3.) That the existing means of irrigation by rain-fed tanks is insufficient and unsatisfactory, and requires to be improved.

(4.) That it is possible at a reasonable outlay, by the construction of reservoirs and supply channels, to ensure a constant supply of water to at least three-fourths of the cultivable area ; and the works he recommends are —

(1.) The reconstruction of the first section of the Ramachendra Kalva from the Sugglair to Porumamilla tank.

(2.) Extensions of the same channel—(*a*) a high level line to Badvel, (*b*) low level line.

(3.) Reservoirs.—The preparation of plans and estimates for four reservoirs—(1) Kottacota (2) Goondlamootoo, (3) Allynagram, and (4) Itigoondlapad.

4. Mr. Unwin has given in appendices statements he has obtained from the Tahsildars of Badvel and Sidhout, showing the probable increase of cultivation in the Sugglair valley if water is supplied, and a statement by the Sub-Collector showing the probable increase in wet cultivation if a supply channel is dug to the Porumamilla tank ; and it is remarkable that, while the Tahsildar's estimate that a little more than 9,000 acres is available in the whole valley, the Sub-Collector considers that 9,000 acres more can be irrigated by only excavating the supply channel. It is observed, however, from the Tahsildar's statement that out of 82,874 acres entered as cultivable only 24,576 are at present wet cultivated, so that it is probable that Mr. Unwin is correct in stating that there is an ample area of land available for cultivation.

5. The information available for calculating the discharge of the river and the water available for irrigation is procured from three cross sections of the river at the site of the proposed anicut at Kalasapad taken in 1873 and gaugings of the river in 1869 and 1873. The maximum discharge is calculated to be 25,928 cubic feet per second. The area of the drainage basin of the river is 250 miles and, using Ryves' formula with a co-efficient of 562·5, the discharge would be 22,325 cubic feet per second, or, using Dickens' formula with a co-efficient of 400, 25,118 cubic feet per second between which the calculated discharge lies. From the gauge readings in 1869 it has been calculated that for a period of six months the discharge would never be less than 1,324 cubic feet per second, which it may safely be assumed, would suffice to irrigate 50,000 acres. In 1869 the rainfall gauged at Badvel was 24·65 ; and it is stated that the average rainfall during the years 1866—74 was 33·91 inches, the minimum being 18·73 inches in 1866 and the maximum 46·51 inches in 1872. The rainfall has been gauged at several stations in the valley from 1873, but the observations would hardly seem to be trustworthy ; it would appear, however, that in a year much below the average there is an ample supply of water for all the land that could be taken up, but in 1876 the supply would probably have been insufficient, though Mr. Unwin states there was then flowing idly to the sea more than sufficient water to save the crops of the taluk.

6. In the statement of tanks, above 100 acres ayacut in the appendix, a column shows the number of acres irrigated per mile of catchment basin by each tank ; the figures in this column do not appear to be altogether correct, but it appears that the average cultivation under the principal tanks is 30 acres to the square mile of catchment basin, though it has been mentioned by Mr. Unwin that the Kalasapad Racheruvu, one of the most important tanks in the valley, cultivates only 10 acres to the square mile. The main stream, however, draws its supply from hill ranges of considerable altitude and, it has been stated, is never quite dry ; it seems therefore reasonable to expect that the proportion of cultivation to drainage basin will be considerably more in the case of the river than in that of the minor drainages which supply existing tanks, and 40 acres to the square mile or 10,000 acres is a very reasonable estimate of the duty it can perform.

7. The cultivation statements furnished by the Tahsildars show the existing cultivation is precarious. On the eastern side of the river the total ayacut under tanks that would be affected by a supply channel from the river is 13,334 acres. For five years (in which the famine year 1876 is apparently not included) the largest area cultivated was 7,118 acres, and the smallest 5,549 acres, that is, under the most favorable circumstances 6,216 acres were left uncultivated. Of the two large tanks, the Porumamilla with an ayacut of 3,091 acres has only once in the last thirty-six years, namely in 1874, filled and discharged a surplus ; the largest area cultivated in the five years above referred to was 2,920 acres and the smallest 2,519 acres ; the Badvel tank with an ayacut of 3,140 acres has once only discharged a surplus in the past twenty years ; the largest area cultivated in five years has been 2,752 acres, and the smallest 2,595 acres.

8. From the information recorded therefore it appears that there is land lying waste for want of water, that there are reservoirs existing which rarely fill, and that there is in ordinary years running to waste past these reservoirs a body of water sufficient for the cultivation of the land lying under them. It would seem to follow that a dam should be built across the river and a supply channel taken off from above it to supply the reservoirs. It appears to have been often proposed to do this, and the remains of an old native anicut and a supply channel to the Porumamilla tank are still in existence. Mr. Unwin proposes to repair this anicut and restore the supply channel to Porumamilla tank. In paragraph 17 of his report he gives a full account of the works he proposes, and has taken for his guide a survey and levels which were made in 1869 with a view to building a new anicut at a place about two miles below the old anicut and excavating a supply channel. A longitudinal section of the old supply channel is given, but there is no information to show the relative levels of the crown of anicut, bed of river, bed of offtake, &c. ; and a considerable amount of work is required before it can be decided how the channel can best be laid out. The principal advantages of the old offtake appear to be that there is a rock foundation for the anicut and part of the old work can be utilized, and that the very heavy cutting, which would be necessary if the channel were taken off about two miles lower down, will be avoided. Cross sections of the river immediately above the old anicut and below it for two miles at least should be taken, and the existing anicut carefully shown in plan and section with water-levels, and longitudinal and cross sections of the old supply channel throughout should be given. The deviation proposed by Mr. Unwin in the 3rd and 4th miles will probably be necessary ; the channel will be a catch drain and at the points where the Polivagu and other drainages cross it sufficient escapes with crests at the full supply level of the channel must be provided. Judging from the levels it would seem that the channel had better be taken above the Kalasapad tank and also, if possible, above the Chintalapad tank, a sluice for the supply of each tank being provided. By taking the channel through the last-named tank an expenditure of 20,000 Rupees for raising the bund would be entailed, which would pay for a very considerable deviation ; it may not, however, be possible to take the channel above the tank, but cross levels from the low hills above the line of the old channel for some distance towards and away from the river will indicate the best line for the new channel. Mr. Unwin at first proposed to reduce the F.T. level of the Porumamilla tank, but, having consulted with Colonel Mullins on the subject, thinks it would be best to retain it as at present. With the supply available in the river it certainly does not appear wise to reduce the capacity of the reservoirs, but an inquiry must be made as to the extent of damage that will be caused by retaining the water at F.T.L., and, if necessary, the estimate must provide for compensation for damage that will be caused. The dimensions of the channel proposed by Mr. Unwin may possibly suffice, but it must be remembered that its chief duty will be to fill the tanks ; and it will be necessary that these tanks should be contoured and their capacity ascertained before the size of the channel can be settled.

9. Mr. Unwin has considered the extension of the channel from Porumamilla to Badvel large tank a separate project ; a line of levels taken in 1869 shows that cutting would be needed only for two or three miles and after that it would seem that by natural drainage courses the water would find its way into the Badvel large tank

and from it might be led to several other tanks lower down. This part of the proposed work must be carefully levelled, and, if the water has to be passed from tank to tank, provision must be made for proper escapes to each tank.

10. The excavation of a supply channel to the chain of tanks on the eastern side of the Sugglair valley is not, however, the only work desirable. Even if the channel is carried out, a large quantity of water must run to waste, and much of this might be caught and utilized either for direct irrigation or to supplement the supply to existing tanks during dry seasons, if large reservoirs near the hills could be constructed. Mr. Unwin was directed to examine certain sites, and has submitted cross sections at the sites of the proposed dams, prepared from observations with an Aneroid barometer, and has given a short account of each site.

11. The first in order of importance, according to Mr. Unwin, is at Kottacott to the west of Kalasapad on a stream called the Kanamaru, which falls into the Sugglair immediately below the site of the old anicut. The catchment basin is 26 square miles; the bund would have to be about 50 feet high and 3,000 feet long; a good site for escape has been found, good material for a bund is close at hand, and stone and lime are easily procurable. Taking the average rainfall to be 33 inches, and assuming that six-tenths of the fall could be stored, the reservoir would cultivate 4,400 acres; land is available for cultivation close to the tank and surplus water might probably be turned into the river above the proposed anicut.

12. The second site is at Goondlamootoo on the Tanamalaru south-west of Giddalore and promises well, except that no saddle has been found for an escape. The area of the drainage basin 55 square miles, the top length of dam would be 600 feet, height of bund 40 feet. Good materials available near at hand, the surplus would fall into the Sugglair above-proposed anicut.

13. The third site is at Allynagarum in the catchment basin of the Porumamilla tank. Area of drainage basin 4 square miles, length of dam about 500 feet, proposed height of dam 50 feet; a good saddle is available for an escape and materials are to be had within a short distance. The reservoir would surplus into the Porumamilla tank, but seeing that the latter rarely fills and that a proposal has been made to carry its surplus water, after the supply channel is excavated, to the Badvel large tank, it does not seem worth while at present to take this reservoir into consideration.

14. The fourth site is on the west of the Sugglair river near Irigoondlapad; the area of catchment basin is 12 square miles, the dam would be about 1,000 feet long and 50 to 60 feet high; a saddle is available for the escape of surplus water; the surplus will fall into the Sugglair below the proposed anicut.

15. Mr. Unwin also suggests the repair of an old tank and supply channel from the Sugglair lying near the Kurnool and Cumbum road in the 75th mile, and refers to a project that was once entertained for turning the upper waters of the Sugglair into the Cumbum tank. The former of these works should be examined and an estimate submitted, if necessary, for the restoration of the tank, but the latter should not be considered until it has been seen to what extent the water of the Sugglair can be utilized in its own valley.

16. The work which should now be taken up is the preparation of plans and estimates for the restoration of the old anicut and the supply channel to the Porumamilla tank and subsequently from it to the Badvel large tank and then to the smaller tanks below in the chain. Mr. Unwin estimates that the necessary work could be done in three months at a cost of Rupees 688, but while irrigation works are under restriction the permanent establishment might be employed on the work with advantage. Then the first two reservoir sites should be thoroughly examined, and, if they promise as well as is expected, plans and estimates should be prepared for the necessary works. The question of the third reservoir site need not for the present be considered, and No. 4 should be taken up only after Nos. 1 and 2 have been investigated.

FORT ST. GEORGE,
31st December 1878.

(Signed) J. O. HASTED, Lt.-Col., R.E.,
Ag. Chief Engineer for Irrigation.

To the Joint Secretary to Government, Public Works Department, Irrigation Branch.

No. 24-C. From Lieutenant-Colonel H. L. PRENDERGAST, R.E., Superintending Engineer, Second Circle, to the Chief Engineer for Irrigation, Public Works Department, dated Bellary, 8th January 1879, No. 1,142.

IN continuation of my letter, No. 902, dated 23rd ultimo, I have the honor to forward three statements showing the area of hills and jungles, dry and wet cultivation, cultivable waste and village sites in the Cumbum, Badvel, and Sidhout Taluks furnished by the Deputy Director of the Revenue Settlement in relation to the Sugglair Project.

No. 25. ORDER THEREON, 14th January 1879, No. 22 I.

THE examination that has been made of the Sugglair river and the irrigation in its valley shows that it will be possible to construct a dam across the river and lead its water to a chain of tanks, two of which are of considerable capacity, on the eastern side of the valley; and also to construct at least two considerable reservoirs which might in dry seasons supplement the supply to existing tanks or directly extend irrigation. His Grace the Governor in Council resolves therefore to call upon the Superintending Engineer, Second Circle, to submit detailed plans and estimates, first for the restoration of the old, or construction of a new anicut, and for the excavation of a supply channel to the Porumamilla and Badvel tanks; and, second, for such extension of it as may appear feasible, and also, third, for the construction of the two reservoirs recommended by the Acting Chief Engineer for Irrigation.

2. While ordinary work is under suspension the permanent establishment will be employed on this duty, and application should be made at the commencement of next official year for sanction to the entertainment of a sufficient extra establishment to complete the work.

(True Extract.)

Lt.-Col., R.E.,
Ag. Joint Secy. to Govt., P.W.D.,
Irrigation Branch.

To the Superintending Engineer, Second Circle.
" Chief Engineer for Irrigation.
" Revenue Department.

Exd. G. Freeman.
20 Spare Copies

Revenue 1879. C&S
No 2258.

IRRIGATION.

Inio 8/15 March/79 No 104.

Govt. of (1870) Madras.

PUBLIC WORKS.

To

The SUPERINTENDING ENGINEER,
SECOND CIRCLE,
&c., &c., &c.

Dated January 1879.

Read

Read 13 March/79

G. O. No. January 1879. No. 58 I

REMARKS.

Nos. 82-85.

Register Project, Estimate Plan &c. of the Superintending Engineer, Second Circle, Plans and estimates for certain works connected with the —

No 1042

Submitted to the Board of Revenue,

15 March 79

1042

To Board of Revenue Regd 13-3-79 Order 15 March