

- (1) Number of pages 42
(2) Date of repair 9.6.86
(3) Initials of the Referencer lans.

TAMIL NADU ARCHIVES

GOVERNMENT OF TAMIL NADU

Revenue DEPARTMENT

G.O. No.		Press.
B.P. No.	1042	Mis.
Dated	15.3.1879	1972

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Q. 2

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 reconnaissance of the Sugglair river.

2. PRELIMINARY.—For this purpose I left Cuddapah on the 15th August and camped at the following places: Codjeeper, Hotimdoogoo, Badvel, Poyalacootla, Porunamilla, Chintapally, Kalasapad, Kottacota, Moondlapand, Giddalore, and on return journey at Nalaguntla, Komaraveel, Allynagarura, Doogayapaly, Porunamilla, 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 Hoodlavagu 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 Moondlapand 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 driest 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

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 Problaved 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 Sommireddipally 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 Appendix 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.
Badvel Taluk.			
Eastern catchment	13,334	99,263	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 437½ 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

showing 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	23,965	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 50 square miles respectively. From the Tahsildar's statement (see Appendix II) 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 Nundicannuma pass road, but a little to south of west from Giddalore on the Yamamalaru 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 Goondlametoo, 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 amphitheatre 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 waterspread of tank with a 40-foot band to be $8\frac{1}{2}$ 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 slope of Hohoballam 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 Kanamara (see paragraph 8). This also rises in Hohoballam 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 Kanamara called Palaondavagu 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 Allynagarum. 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 $1\frac{1}{2}$ 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 $2\frac{1}{2}$ 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, Bommapapayapaly, 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 Maradamani 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 Warycoonta 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 Kendoor on the Goondnavagu 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 1,900 acres of land which lies between it and the village of Kristenusetyaly. 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 Giddalore 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 Giddalore 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 29th 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 outlet 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;

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 groynes or two, and for a length of 600 feet from 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 a watershed of 9 square miles. From 8 miles to 6 furlongs to junction with Chintalapaly 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 1114 millions square feet, average depth at 6½ feet, and capacity 263 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 1½ feet per mile. I propose 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 20,000 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 Chennareddy tank and Boppapuram tanks and on to Kodur will add considerably to the probable increase in revenue. The old Ramachandra Kalra evidently provided for this as

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 Chennareddy 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 Poyalacoontla 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 Siddavaram 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' x 3' and on the south 3' x 3'. Excessive surplus finds its way direct to the Suggair, otherwise it is led by field channels to Chennampali, Godaganoor, and Puttayapaly to the Suggair, 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 6,057 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-Nagulacheruvu (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 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 Suggair 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.	614	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.
- That there is an ample area of land available for a large increase in wet cultivation.
 - That there is sufficient supply of water if it is properly applied.
 - That the existing means of irrigation by rain-fed tanks is insufficient and unsatisfactory and requires to be improved.
 - 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 Ramachandra 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 Chintalapaly tank as proposed by Mr. Lewis, at a cost of Rupees 7,000. The reconstruction of the Ramachandra 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.

Rainfall Register for Cuddapah District.										SIDHOUT TALUK.				
Months.	BUDWAIL TALUK.								Days.	Inches.	Days.	Inches.		
	Badvel.		Hittima- dugu.		Peru- mamilla.		Kalsapad.						Poyala- coontla.	
	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.					Days.	Inches.
1875.														
January ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
February ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
March ..	1	0.45	..	..	..	..	..	..	..	..	..	..	..	..
April ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
May ..	3	3.39	..	..	..	..	..	..	..	..	..	..	5	2.70
June ..	2	0.89	..	..	..	..	..	..	..	..	..	..	9	4.70
July ..	4	2.69	..	..	..	..	..	..	..	..	..	..	7	3.75
August ..	3	3.35	..	..	..	..	..	..	..	..	..	..	2	0.15
September ..	4	4.28	..	..	10	4.23	..	..	3	1.87	..	..	4	1.50
October ..	11	4.28	..	..	6	1.93	1	0.61	..	..	..	..	..	..
November ..	4	1.80	6	4.65	3	3.85	3	0.25	..	..	..	..	..	..
December ..	1	0.50	..	..	1	0.03	3	0.31	..	..	..	..	..	..
December ..	1	1.49	1	1.15	1	0.35	3	0.31	..	..	..	..	..	..
Total ..	31	19.59	7	5.89	25	10.48	7	0.77	5	1.87	..	23.8	27	13.10

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

Months.	BUDWAIL TALUK.								SIDHOUT TALUK.					
	Badvel.		Hottima- dugu.		Peru- mamilla.		Kalsapad.		Poyala- coontla.		Sidhout.		Radypaly.	
	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.	Days.	Inches.
1876.														
January ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
February ..	..	..	..	..	1	0.60	3	0.27	..	..	..	0.6	..	..
March ..	1	0.45	..	..	3	0.39	2	0.06	1	0.65	..	..	1	0.30
April ..	..	..	..	..	2	1.18	3	0.30	2	0.45	..	0.2	2	0.30
May ..	1	0.30	..	..	2	1.22	8	1.31	3	0.42	..	1.3 ¹ / ₂	2	0.40
June ..	..	..	3	1.05	6	0.54	6	1.91	3	0.70	..	0.7	1	0.30
July ..	4	0.55	1	0.25	4	0.54	..	..	..	..	..	3.6 ¹ / ₂	4	2.60
August ..	3	13.5	7	3.35	9	4.74	11	4.64	6	4.15	..	1.2 ¹ / ₂	..	..
September ..	..	..	2	1.00	2	0.10	5	0.23	1	0.20	..	..	..	..
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	6.95	26	9.07	40	9.59	18	6.97	..	32.1 ¹ / ₂	12	5.40
1877.														
January ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
February ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
March ..	1	0.30	..	..	3	1.20	4	1.72	1	0.15	..	0.7 ¹ / ₂	..	0.65
April ..	1	0.15	2	0.45	..	..	1	1.02	1	0.05	..	0.4	..	..
May ..	5	4.59	3	4.28	2	4.42	3	3.76	3	4.64	..	5.7 ¹ / ₂	..	5.60
June ..	4	2.07	6	2.19	2	1.69	2	0.87	5	3.25	..	4.3	..	4.32
July ..	4	0.65	2	0.70	1	0.50	7	1.24	3	0.70	..	1.1 ¹ / ₂	..	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	6.70	11	12.75	13	8.94	8	10.00	..	9.5 ¹ / ₂	..	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	..	1.4 ¹ / ₂	..	0.60
December ..	1	0.10	..	..	..	..	..	..	..	..	..	0.1	..	..
Total ..	45	23.05	39	19.37	25	23.37	60	28.20	38	27.74	..	32.1 ¹ / ₂	..	21.38
1878.														
January ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
February ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
March ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
April ..	..	..	..	0.20	..	0.50	..	5.20	..	..	..	0.4 ¹ / ₂	..	0.97
May ..	..	..	..	.45	..	0.70	..	1.88	..	..	..	1.4	..	0.65
June ..	..	..	..	..	..	1.40	..	.17	..	2.40	..	2.4 ¹ / ₂	..	1.47
July ..	..	1.9 ¹ / ₂	..	1.30	..	..	..	..	..	..	..	16.7 ¹ / ₂	..	12.55
August ..	..	5.8 ¹ / ₂	..	6.25	..	5.70	..	6.69	..	5.93	..	10.7 ¹ / ₂	..	6.12
September ..	..	6.9 ¹ / ₂	..	4.85	..	5.00	..	7.74	..	6.08	..	11.5 ¹ / ₂	..	7.35
October ..	..	8.5 ¹ / ₂	..	0.15	..	6.00	..	6.83	..	3.95	..	5.3 ¹ / ₂	..	..
November ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
December ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total ..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

CUDDAPAH,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

APPENDIX B.
Saghai River Investigation, British India.
Statement of Tails above 100 Acres August

Statement of Tanks above 100 Acres Aynaut															
Number	Latitude	Longitude	Drainage Area.	Drainage Area.	Name of Tanks.	Area.		Total Assessment of Aynaut.	Drainage.		Lowest Cultivation.		Average Cultivation.	No. of Acres per Mho of Cultivation.	
						Acres.	Acres.		Year.	Year.	Acres.	Acres.			
1	15 11	79 0	98	..	..	527	71	998	1,281	1,629	1,281	1,629	59	3,909	10
2	15 11	79 0	4	..	..	132	76	208	1,281	1,281	1,281	1,281	128	1,734	42
3	15 11	79 0	4	..	..	74	39	113	1,281	1,281	1,281	1,281	128	1,734	42
4	15 11	79 0	4	..	..	86	61	147	1,281	1,281	1,281	1,281	128	1,734	42
5	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
6	15 11	79 0	4	..	..	72	62	134	1,281	1,281	1,281	1,281	128	1,734	42
7	15 11	79 0	4	..	..	107	47	154	1,281	1,281	1,281	1,281	128	1,734	42
8	15 11	79 0	4	..	..	137	46	183	1,281	1,281	1,281	1,281	128	1,734	42
9	15 11	79 0	4	..	..	137	46	183	1,281	1,281	1,281	1,281	128	1,734	42
10	15 11	79 0	4	..	..	94	28	122	1,281	1,281	1,281	1,281	128	1,734	42
11	15 11	79 0	4	..	..	81	41	122	1,281	1,281	1,281	1,281	128	1,734	42
12	15 11	79 0	4	..	..	41	59	100	1,281	1,281	1,281	1,281	128	1,734	42
13	15 11	79 0	4	..	..	2,057	1,776	3,833	1,281	1,281	1,281	1,281	128	1,734	42
14	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
15	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
16	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
17	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
18	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
19	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
20	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
21	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
22	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
23	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
24	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42
25	15 11	79 0	4	..	..	1,281	1,281	3,909	1,281	1,281	1,281	1,281	128	1,734	42

[illegible]

CUPNARAI, 1878.
21st November

(Signed) **II. 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 full.	3 months' supply	21 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.	"	6.75 feet below.	low.	Do.	Do.	Do.	Do.	18 feet below.	13 feet below.
March	Water in the tank about 1 1/2 yard below crest.	No water in the tank.	Do.	10 days' water.	Do.	Do.	Do.	Do.	Do.	Do.	21 feet below.	15 feet below.
April	Water in the tank one yard below crest.	Do.	Do.	"	9 feet below.	10 feet below.	Do.	Do.	Do.	Do.	25 feet below.	Almost dry.
May	5 months' water.	Do.	Tank nearly full.	1 month's supply	15 feet below.	14 feet below.	Do.	Do.	23 feet below.	10 1/2 feet below.	23 feet below.	12-75 feet below.
June	"	Do.	Tank half full.	2 months' "	15 feet below.	13 feet below.	Do.	Do.	23 feet below.	11 feet below.	Almost dry.	Almost dry.
July	"	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	Do.	23 feet below.	12 feet below.
August	"	2 months' water.	24 feet below.	7 1/2 feet below.	19 1/2 feet below.	11 1/2 feet below.	21 feet below.	16 feet below.	21 feet below.	Only 2 days' water.	22 feet below.	10 feet below.
September	"	20 days' "	"	This is the first time the tank has filled for the last 13 years.	19 feet below.	25 feet below.	No water in the tank.	No water in the tank.	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.	"	No water.	No water.	Do.	Do.	19 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.

GUDARAU,
21st November 1878.

(Signed) H. UNWIN,
Executive Engineer.

APPENDIX D.
Suggala River Investigation, Siddout Tank.
Statement of Tanks above 100 Acres Ayacut.

Number.	Latitude.	Longitude.	Drainage Area.	Maximum Flood Discharge from Drainage.	Names of Tanks.	Ayacut.		Total.	Total Assessment of Ayacut.	Highest Cultivation.		Lowest Cultivation.		Average Cultivation for 5 Years from 1281 to 1286.	No. of Acres per Acre of Catchment Basin.	Average Collections.
						ACRES.	INAM.			Year.	ACRES.	Year.	ACRES.			
1	14 29	79 8	..	..	Kamalakoot Pedacheru	225	100	325	2,619	1282	413	1286	215	1,205	..	17,528
2	14 37	79 8	..	..	Madupoor Kakkoota	239	83	322	1,634	1284	280	1286	111	1,201	..	..
3	14 35	79 9	..	..	Kamalakoot Pedacheru	90	61	151	1,722	1284	130	1286	93	1,256	..	..
4	14 34	79 9	..	..	Kamalakoot Pedacheru	78	41	119	933	1284	120	1286	99	1,256	..	..
5	14 37	79 9	..	..	Madupoor Pedacheru	208	97	305	3,750	1282	289	1286	106	2,310	..	..
6	14 33	79 9	..	..	Journavaram do.	74	60	134	1,531	1284	144	1286	131	974	..	..
7	14 30	79 8	..	..	Total ..	912	492	1,404	12,279	..	1,376	..	845	7,639	..	..
8	..	..	..	..	Circular Tanks below 100 Acres Ayacut.	121	25	146	946	..	180	..	143	998	..	..
9	..	..	..	..	Tanks ..	..	..	..	..	..	..	..	..	..	..	..
10	..	..	..	..	Desamandam and Sirothram.	91	41	132	1,572	..	180	..	49	..	..	..
11	..	..	..	..	Private Tanks ..	..	..	..	..	..	..	..	..	..	..	..
12	14 30	79 8	..	..	Western Side.	64	49	113	720	1284	134	1286	..	618	..	..
13	14 35	79 7	..	..	Kombachididam tank	85	62	147	1,453	1284	170	1286	34	631	..	..
14	14 34	79 7	..	..	Kondoor Kakkoota	99	76	175	1,453	1282	184	1286	82	1,025	..	..
15	14 32	79 6	..	..	Alloor Kakkoota	269	163	432	3,412	1284	397	1286	181	2,415	..	..
16	14 31	79 6	..	..	Warloona Pedacheru	113	66	179	1,719	1284	80	1286	79	1,031	..	..
17	14 30	79 7	..	..	Thaloor Pedacheru	58	57	115	1,614	1284	..	1286	..	821	..	..
18	..	..	..	..	Oyyaloor Pedacheru	638	470	1,108	10,280	..	1,060	..	383	6,594	..	..
19	..	..	..	..	Total ..	212	87	299	1,800	..	682	..	215	2,277	..	..
20	..	..	..	..	Circular Tanks below 100 Acres Ayacut.	..	..	..	..	..	..	..	..	..	..	..
21	..	..	..	..	Tanks ..	..	..	..	..	..	..	..	..	..	..	..
22	..	..	..	..	Desamandam and Sirothram.	188	89	277	2,111	..	352	..	213	..	..	..
23	..	..	..	..	Private Tanks ..	..	..	..	..	..	..	..	..	..	..	..

(Signed) H. UNWIN,
Executive Engineer.

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

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

Village Name.	Total Area in Acres.	Jungles 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.	Acres.	Water Rent.	Acres.	Assessment.	Second Crop Assessment.	Acres.	Second Crop Assessment.	Acres.	Water Rent.	Acres.	Assessment.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
Porumamilla Group.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

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

BADVEL,
4th November 1878.
CUDDAPAH,
21st November 1878.

(Signed) P. DHOND ROW,
Tahsildar of Badvel.
(Signed) H. UNWIN,
Executive Engineer.

APPENDIX H.

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

Increase in Wet Cultivation in the Saggclair Valley, Sidhout Taluk.											
Number.	Name of Villages.	Total Area of the Village.	Area of Hills and Jungles.	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.											
1	Kamaishoor ..	4,662	1,999	1,450	32	308	236	882	3,766	200	600
2	Madupoor ..	7,161	5,398	200	50	469	559	844	5,418	98	294
3	Kamasamudram ..	2,826	1,740	581	12	395	132	98	565	54	162
4	Kamaloor ..	835	160	120	30	335	609	150	1,420	15	45
5	Pedatalapayapaly (Agraharam) ..	5,974	4,590	60	..	95	1,523	329	2,674	40	120
6	Jonnaram ..	4,061	3,464	50	..	..	..	..	..	..	..
7	Kangampaly ..	1,331	1,141	10	..	156	238	24	108	10	80
8	Malenipatnam ..	6,241	4,637	63	..	1,569	2,731	176	919	660	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	Tiparapaly ..	2,390	1,581	390	32	275	153	82	405	150	450
11	Venkatachetyapaly ..	1,519	..	1,350	5	78	..	56	550	20	60
12	Rajopalem ..	2,355	1,583	452	..	285	325	33	154	400	1,200
13	Yerrapaly ..	2,503	1,620	360	..	545	372	78	392	260	800
14	Tennakallagondi ..	5,725	4,610	400	..	714	778	14	70	100	300
15	Gajulavaripaly ..	1,725	1,160	30	20	385	465	121	676	100	300
16	Koombagiri ..	688	21	120	60	347	595	140	936	160	300
17	Kondoor ..	6,944	5,506	461	..	565	517	282	2,068	600	1,800
18	Attloor ..	7,258	5,746	30	2	1,074	1,470	406	3,177	150	450
19	Varicoonta ..	4,748	3,851	40	..	373	538	484	3,259	50	150
20	Viroor ..	2,022	1,175	30	..	755	1,453	62	462	20	60
21	Mathar ..	2,065	1,564	57	..	360	1,201	147	845	10	30
22	Tudoor ..	2,101	1,637	2	..	199	300	271	1,890	20	60
23	Voopatoor ..	3,810	1,586	795	243	712	192	274	1,803	260	600
24	Chendooavaga ..	4,562	2,563	29	..	890	1,261	89	297	400	1,200
Total ..		60,199	35,362	4,567	363	7,433	9,727	2,539	16,984	2,520	7,560
26th October 1878											

26th October 1878.

CUDDAPAH,
21st November 1878.

(Signed) H. RAMIAH, Tahsildar.

(Signed) H. UNWIN,
Executive Engineer.

APPENDIX J.

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

Proposed New Reservoir at Kottacota near Kalasapudi.

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.		
New tank at Kottacota.	Dagava Tumbalapaly ..	10	Rs. 50	125	Rs. 560	54	Rs. 170	189	Rs. 720	Rs. 465	ACRES. 1,125
	Kottacota ..	112	560	436	2,180	93	270	638	3,010	425	3,435
	Eruva Tumbalapaly ..	12	60	75	375	10	50	97	455	114	399
	Potha Ramapuram ..	40	200	60	360	10	50	110	650	130	780
	Sengarayapaly ..	10	50	50	250	20	100	80	400	100	500
Total ..		184	920	716	3,605	181	610	1,114	5,165	1,194	6,359

Note by the E. ...

Note by the Executive Engineer.—An immediate return may be expected by
And further increase after 5 or 6 years

Grand Total .. 7,493 33,780

(Signed) P. DHOND ROW,
Tahsildar of Badvel.
(Signed) H. UNWIN,
Executive Engineer.BADVEL,
4th November 1878.
CUDDAPAH,
21st November 1878.

APPENDIX K.

We, the curams, 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, Shrotriendar, 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, curams, 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, Shrotriendar, 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 5 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	
	1,000	8	164	294,400		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		253	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	1,066	2,136,300		366	567,300	
	1,050	26	1,066	2,136,300		366	567,300	
	2,370	20	700	1,659,000		294	606,780	
	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	
				18,402,116			5,143,186	
			C. yds.	496,374		C. yds.	190,488	
				190,488				
				305,886				

Abstract Estimate.

Contents.	Particulars.	Rate.	Per	Amount.	Total.
190,438	Cubic yards of earthwork in top lift.	RS. A. P.	C. yard.	RS.	RS.
305,886	" " in shale rock ...	0 1 6	"	17,854	
		0 6 0		1,14,787	
	Contingencies at 5 per cent. ...	...	...	1,32,641	
				6,632	
	Masonry and other works ...	...	...	1,30,273	
				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 Ramachandra Kalwa to convey water from the Sagglair River to Perumamilla Tank.

One surveyor for three months, at Rupees 100 per month	...	...	...	RS. 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

Sundries at 5 per cent. ... 656
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.	Hanks.	Total Area in Acres.	Jungle and Waste.	Cultivated.		Nature of Water supply?	Is it sufficient?	Promote Increase in Cultivation if Water Available.		Probable Assessment.	Remarks on the Water supply and present Crop raised, probable increase, source of information.
				Dry.	Wet.			Government.	Imm.		
Brahmapalle ..	..	1,733 3	480 83	A. C. 1,257 40	..	Kotakaira ..	..	180	50	638 10 0	..
Gridhalara ..	..	4,989 39	3,453 58	1,437 13	..	Sagglair ..	..	100	100	800 0 0	..
Krishnamattipalle ..	..	3,155 7	2,263 70	706 10	..	Tanks ..	..	10	10	25 0 0	..
Sanjavaraviketa ..	..	3,330 73	2,687 30	685 5	119 27	..	..	100	160	200 0 0	..
Vuyyalavada ..	..	3,641 51	2,000 12	1,755 74	..	Tank ..	..	300	250	650 0 0	..
Gadketa ..	..	4,048 88	3,416 82	630 41	..	Sagglair ..	..	100	100	400 0 0	..
Mundlapadu ..	..	7,621 20	5,076 41	1,680 82	25 72	Tank ..	..	..	..	250 0 0	..
Kottakota ..	..	2,655 51	2,204 78	1,260 48	23 41	Yennunilur ..	..	100	100	400 0 0	..
Kommatur ..	..	2,180 50	1,493 51	666 1	21 39	Wells ..	..	100	100	800 0 0	..
					20 98	Yennunilur ..	..	1,010	880	4,013 10 0	..

Forwarded to the Executive Engineer on special duty Sagglair Project with reference to this office docket, No. 1,595, dated 22nd November 1878.
 (Signed) G. W. FAWCETT,
 Acting Head Assistant Collector.

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.

10th December 1878.

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 Jummalar 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.		Area of Village Sites.
				Dry.	Wet.	Dry.	Wet.	
9	Rampuram ..	14,431 32	10,016 16	724 52	1,109 53	605 50	38 25	71 20
10	Rammanapalle ..	5,352 23	4,501 44	508 18	294 74	275 10	15 14	13 76
11	Bodducherla ..	3,943 19	3,325 44	166 52	221 12	85 6	20 20	10 86
12	Viswanadapuram (Agraharam) ..	16,789 22	12,961 76	1,745 94	412 41	781 6	5 27	63 75
23	Vohalam ..	4,569 89	3,725 23	194 23	166 46	211 46	..	11 16
18	Kokulakunta ..	1,178 83	611 84	178 83	106 26	49 45	..	6 70
31	Bakkayapalle ..	2,666 93	1,834 54	313 79	51 54	165 9	..	21 42
32	Ravalakolla ..	6,261 79	4,239 36	619 63	212 75	312 13	6 50	22 6
35	Yappirala ..	4,528 43	3,353 36	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 Darni-official letter.

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.	
1	Chennapalle ..	3,962 10	2,194 52	391 61	..	47 41	..	4 56
5	Rajapalem ..	2,400 13	1,555 62	193 74	440 74	23 46	13 68	4 94
13	Mamillapalle ..	2,623 67	2,192 49	242 30	48 84	62 11	1 72	3 86
17	Ayyasvampalle (Agraharam) ..	9,853 32	5,222 40	885 72	51 81	848 64	14 32	16 46
18	Talagad ..	454 32	..	127 50	63 6	217 53	..	3 49
19	Dularavariapalle ..	2,273 23	302 8	514 94	93 47	465 19	5 42	1 82
20	Kodapeta ..	10,970 91	7,690 55	1,018 12	180 22	762 51	0 54	8 63
21	Balayapalle ..	11,885 89	6,696 0	1,511 59	..	747 56	..	23 23
22	Varkunta ..	1,577 62	..	1,362 8	33 3	51 27	..	4 97
29	Mulapalle ..	1,226 6	..	216 59	97 45	121 78	1 55	8 55
30	Gunganapalle ..	720 34	..	463 33	83 5	80 18	1 85	8 11
31	Gontavariapalle ..	..	..	..	..	..	..	..
32	Vasudevapuram (Agraharam) ..	..	..	..	..	..	..	..
36	Vengalampalle (do.) ..	..	..	..	..	..	..	..
37	Nayandipalle ..	14,546 38	13,657 92	714 8	..	214 50	..	2 31
38	Akkengundla ..	7,623 65	4,640 48	1,014 16	..	316 39	..	3 31
40	Pagadalapalle (Agraharam) ..	17,503 58	8,673 69	4,018 65	108 49	1,196 63	..	23 9
43	Higundalapad ..	..	..	..	..	..	..	..
44	Akkampeta (Agraharam) ..	..	..	..	..	..	..	..
45	Mattipalle ..	3,195 10	628 45	709 53	..	165 48	..	30 67
46	Papireddipalle ..	4,383 75	1,923 20	555 6	..	278 17	..	7 15
48	Nemireddipalle ..	12,074 88	4,669 44	3,328 39	163 66	1,320 49	..	23 12
49	Sanjavaraviketa ..	11,069 23	6,424 32	2,566 27	65 79	569 31	14 34	47 23
50	Regulakunta ..	19,312 7	15,091 28	2,149 76	23 64	547 10	..	33 92
51	Darbhavari (Agraharam) ..	..	..	..	..	..	..	..
54	Narasimhapuram (do.) ..	..	..	..	..	..	..	..
55	Eguvanchatur ..	7,765 20	..	493 24	25 5	152 23	2 51	10 55
59	Narasimhapuram (Agraharam) ..	..	..	..	..	..	..	..
60	Isavadarivariapalle ..	3,422 53	384 20	127 63	89 5	442 34	3 57	8 14
63	Pedilapalle ..	1,273 0	234 40	271 32	145 78	99 70	0 66	6 1
64	Narasimhapuram (Agraharam) ..	..	..	..	..	..	..	..
65	Kemakunta (do.) ..	..	..	..	..	..	..	..
67	Vemakunta (do.) ..	..	..	..	..	..	..	..
68	Kotipalle (do.) ..	..	..	..	..	..	..	..
74	Bodukondapalle (do.) ..	..	..	..	..	..	..	..
76	Perannagaripalle (do.) ..	..	..	..	..	..	..	..
78	Koppapuram ..	1,074 56	59 20	322 39	77 79	224 31	1 24	0 33
79	Chennareddipalle (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.	
83	Sancharla ..	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.
84	Lachempalle (Agraharam) ..	8,201 60	5,183 52	1,372 68	58 28	714 68	..	19 29
85	Siddanahichayapalle (do.) ..	..	..	..	..	..	..	..
86	Munireddipalle (do.) ..	..	..	..	..	..	..	..
87	Konnapetipalle (do.) ..	..	..	..	..	..	..	..
88	Kavulakuntla ..	..	..	..	..	..	..	..
89	Pachampalle (Agraharam) ..	20,236 22	12,318 40	2,792 75	631 87	1,517 67	15 72	31 25
90	Cheripalle ..	..	..	..	..	..	..	..
91	Chinnarayapalle (Agraharam) ..	8,955 53	4,242 40	1,513 64	472 35	625 33	16 2	41 17
92	Virupalle (do.) ..	..	..	..	..	..	..	..
93	Siddavaram ..	..	..	..	..	..	..	..
94	Seshampalle (Agraharam) ..	5,577 46	2,785 60	555 8	130 23	249 61	0 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 55
99	Venkatramapuram (Agraharam) ..	3,531 50	2,053 4	429 70	129 55	330 18	0 17	..
100	Ravatepalle ..	..	..	..	..	..	..	..
101	Miliyapad (Agraharam) ..	720 26	..	356 57	..	184 67	..	6 58
102	Gangapenta ..	..	..	..	..	..	..	..
103	Chennakristapuram (Agraharam) ..	11,495 74	8,325 41	1,007 37	235 74	645 97	0 83	7 6
104	Lakkavaripalle ..	..	..	..	..	..	..	..
105	Appajipeta (Agraharam) ..	4,627 25	2,023 52	536 90	118 5	435 37	..	8 9
106	Kalavapalle ..	..	..	..	..	..	..	..
107	Kondupalle (Agraharam) ..	1,987 8	631 8	559 93	403 69	74 60	4 98	24 71
108	Etirupalle ..	..	..	..	..	..	..	..
109	Lingurupalle (Agraharam) ..	2,325 50	154 80	254 63	231 23	37 8	1 62	13 43
110	Tippurazupalle ..	..	..	..	..	..	..	..
111	Madhavariyapalle (Agraharam) ..	774 7	..	185 53	41 25	55 47	2 53	1 90
112	Ramapuram Agraharam ..	..	..	..	..	..	..	..
113	Goravaram ..	..	..	..	..	..	..	..
114	Abbasahubeta (Agraharam) ..	26,286 17	11,655 30	2,929 15	514 74	574 63	12 18	23 65
115	Kottipalle (do.) ..	..	..	..	..	..	..	..
116	Dayyanapalle ..	..	..	..	..	..	..	..
117	Mehadisapuram (Agraharam) ..	418 12	..	193 44	70 80	47 96	1 2	4 1
118	Chintalacheruvu ..	..	..	..	..	..	..	..
119	Konduguripalle (Agraharam) ..	1,314 75	223 49	251 54	300 44	83 28	1 70	8 29
120	Gopalapuram (do.) ..	..	..	..	..	..	..	..
121	Virupalle ..	..	..	..	..	..	..	..
122	..	12,631 87	10,755 92	702 57	163 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 Cumbam Taluk, Kurnool District, lying above the Water-shed of the Porumamilla and Racharavu 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.	
72	Nallagunta ..	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.	A. C.
73	Razupalem ..	2,539 71	554 47	1,248 85	A. C.	A. C.	A. C.	16 97
74	Idamakalla ..	4,084 71	119 0	2,931 55	162 59	244 82	0 79	39 5
100	Rommaravel ..	6,859 53	2,754 22	2,513 7	103 11	505 9	1 22	42 47
101	Pallareddipalle ..	3,053 11	135 97	1,913 79	224 78	412 79	4 35	9 57
102	Chintalapalle ..	1,578 4	327 82	776 19	152 25	200 71	55 91	..
103	Sarvireddipalle ..	12,747 51	375 68	1,563 39	17 17	..	..	28 87
104	Guntur ..	2,514 33	551 7	835 2	..	227 82	..	5 83
105	Reddicherla ..	397 80	..	397 79	84 55	124 53	1 54	6 19
106	..	6,753 51	945 58	4,420 77	..	1 57	..	35 55
107	Allanagaram ..	4,545 17	897 92	2,617 59	75 3	431 44	3 23	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. In Acs.	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	Vennayapalle	12,037 79	..	..	..	..	..	..
83	Singariddepalle							
84	Kristnapalle							
85	Pedunapalle							
80	Suravaripalle							
87	Mettupalle	260 88	..	..	..	..	..	..
88	Balesepalle							
77	Gudurumorrappalle							
165	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.

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 Paragraphs 14 and 16 of Report. the Collector, but that he has now closed his report without it.

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 Ramachandra 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) Allynagaram, 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 25,228 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 Recheruvu, 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 Goondiamootoo on the Tamamalaru 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 Itigoondlapad; 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. 992, 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.)

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

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

Ed. G. Freeman.
20 Spare Copies

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