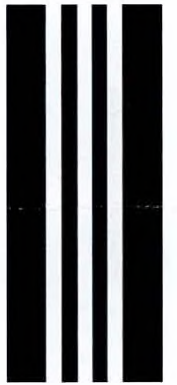


3,036

Generic Process

Document



Copyright 2020 Kaniklides Scanning Services. All rights reserved.



B. 6868.



CYPRUS

WATER SUPPLY AND IRRIGATION DEPARTMENT

WATER SUPPLY IN CYPRUS

ANNUAL REPORT FOR 1947

BY

A. CAWLEY, B.Sc., A.R.S.M., A. INST. M.M.

Acting Water Engineer

WATER DEVELOPMENT DEPARTMENT LIBRARY
Book No. 6868.
Periodical No. /
Catalogue No. /
Date received Mar, 75

NICOSIA

PRINTED AT THE CYPRUS GOVERNMENT PRINTING OFFICE

1948

[July, 1948—200. M.P. 284/48.]

Price 2 shillings.

WATER SUPPLY IN CYPRUS

WATER DEPARTMENT
DEPARTMENT OF AGRICULTURE
6868
Period of Report
Catalogue No.
Date received Mar, 75

ANNUAL REPORT FOR 1947

Since its inception in 1939 the Water Supply and Irrigation Department has been responsible for all spheres of Government water supply covering irrigation, the provision of water for domestic and industrial purposes and investigation for new sources of supply. The policy of development of all free-flowing sources of water for gravity irrigation in order to give the Island a greater degree of self-sufficiency in its crop production, has been actively continued. Investigation has largely consisted of drilling to locate suspected but undeveloped aquifers, irrigation works have been constructed at the speed dictated by the Ten-Year Programme of Development and only work on the provision of ample supplies of good quality water for domestic purposes in villages has remained below the desired level due to seriously inadequate supply of iron and steel products, principally pipes, pumps and engines.

2. STAFF: The expatriate staff of two was depleted on the 30th March, 1947, by the transfer to Nigeria of the head of department, the Water Engineer, since when the Assistant Water Engineer has acted in his stead in addition to performing his own duties. The senior Cypriot staff numbered seven, as compared with eight in 1946, and were concerned with the various sub-divisions of the department's work, viz., village water supplies, Eastern Mesaoria Irrigation Works, design and construction of weirs, dams and tanks, drilling, drainage, inspection and maintenance, etc. About 85 technical assistants and foremen under control of the senior technical staff were responsible for the actual construction and maintenance work while an average of 926 daily or weekly paid workmen were employed during the year with a maximum of 1,103 during the month of October. Of these employees 15% were classified as skilled workmen. The total expenditure on wages during the year was £85,500. A clerical staff of twelve was maintained at departmental headquarters.

3. IRRIGATION: The policy of development of free-flowing water for comparatively small irrigation works on the village rather than the regional scale has been maintained and numerous new works have been completed for the irrigation of cereals from winter and spring flood flow and of summer cash crops from the year round flow of springs, streams, galleries and boreholes. The works are of such size that they can be conveniently managed by committees of the beneficiaries under the guidance of the District Administrative staffs. Despite increasing costs of works as the result of higher wages and cost of materials there is no abatement in the demand for new schemes from the farming communities who willingly pay substantial contributions to the cost of the works in eagerness for the immediate benefits of irrigated fields. A notable feature of the year has been the marked increase in the number of works where the beneficiaries have undertaken to provide free labour in lieu of a cash contribution thus avoiding the necessity of raising a loan. Gravity irrigation works as listed in appendix "A" have been carried out during the year in 94 villages as the result of which 27,100 donums were commanded, 6,671 donums of which have the advantage of perennial water. Expenditure from all sources on irrigation schemes in 1947 was £177,144 of which £36,351 was provided by the beneficiaries, either in cash or labour, and if the former, generally found by a low interest medium-term loan from the Public Loan Commissioners.

4. In the plains the gravity irrigation works constructed largely consist of weirs with ancillary retaining walls, channels, aqueducts and culverts to divert winter flood water to the land, the most ambitious scheme being one in the Pedieos river to irrigate lands of the villages Marathovouno, Mousoulita, Prastio, Pyrga and Yenagra. The first part of this scheme was carried out in 1947 and 5,000 donums were brought under irrigation while in the winter of 1948-49, by which time the whole works will have been completed, a total of 20,000 donums will be commanded. In the hills where forests encourage permanence of springs and streams, flows have been increased by tunnelling and clearing and the enhanced supplies led by lined channels to masonry tanks of capacity sufficient to store the night flow, thus obviating the tedium and waste of irrigation by darkness.

5. In general the hill streams of Cyprus are of too steep gradient to permit the construction of dams with reasonable reservoir storage in relation to size of dam but in isolated localities suitable sites have been found for quite small dams to store some ten to twelve million gallons of water for late spring and early summer irrigation. Sites for these dams require forested catchments not in active erosion to keep silting to a minimum and even then adequate scouring gates are necessary in the dam walls to allow subsequent clearing of accumulated detritus. The popularity of the initial two works of this type at Lythrodhonda and Lymbia constructed in 1945 gave rise to demand for more and in 1947 similar works were completed at Akrounda, Kalokhorio (Klirou) and Petra.

6. Driving of infiltration galleries into the gravels of the seasonally flowing Xero and Krysoxhou rivers in the Paphos District has shewn that large quantities of sub-surface water can be tapped and gravitated to the surface even though there is no water in the actual river bed. The Gastrapi gallery in the Khrysoxhou river was completed during the year with a total length of 4,000 feet, 1,840 feet of which was in water-bearing gravels and gave a mid-summer flow of half a million gallons per day and several million gallons in winter. The Mandria gallery in the Xero river has been driven for 3,000 feet with 400 feet in productive ground; it is proposed to continue the gallery for a further 2,000 feet when a flow of the order of magnitude encountered at Gastrapi may be reasonably expected. The value of this water in summer, from rivers which are dry at surface, cannot be overestimated and has brought under summer irrigation large areas of land which have not previously had this advantage. The results of these works which have been largely experimental in character will form a most useful guide in the future execution of similar projects in other rivers of the Island.

7. VILLAGE WATER SUPPLIES: Demand from villages for entirely new, or improvements to existing domestic water supply systems continues unabated, but with the supply of pipes continuing at a very low level, it has been possible to meet but few, even of the more urgent of these demands. During the year piped water supply schemes were completed in twenty-six villages to serve a total population of 12,684 and at the close of the year work was still in progress at a further twenty-two villages. Preliminary development work on sources of water to be used for domestic supply was completed at nineteen villages and at another thirty-five villages preliminary investigation of schemes and estimates of cost were made during the year. A total expenditure of £31,871 which includes the share of the cost borne by the villages was incurred in 1947 on village domestic water supply work. In addition to work for villages, ample supplies of water were made available for the Kyperounda Sanatorium and for the Karaolos (Famagusta) and Xylotymbou Illegal Jewish Immigrants' Camps.

8. EASTERN MESAORIA IRRIGATION WORKS : With a staff of a Senior Inspector of Water Supplies and four Irrigation Guards, these works functioned normally. The revenue from all sources was £2,523 shewing an increase over that for 1946 which was due to greater use of irrigation water. Kouklia reservoir reached its highest level in February with 13.8 feet of water and was used to irrigate some 4,000 donums of cereals. A total of 1,963 donums, principally in the dry beds of Kouklia and Akhyritou reservoirs was leased during the year for cultivation and the lease of 390 donums of the bed of Syngrasi reservoir was renewed in August for a further period of five years. The damaged weir in the wall at Syngrasi was rebuilt to cause silting up of the scoured water-course traversing the reservoir bed. In 1947, licences for grazing in the eastern Mesaoria reservoir lands were issued in respect of 6,400 sheep and goats against 6,243 in 1946, 6,687 in 1945 and 5,932 in 1944.

9. DRILLING : Until mid-February five drilling rigs were in the field and subsequently seven, with the loan of an additional two by the Army. At the close of the year the two new rigs provided under Colonial Development and Welfare Scheme D.714 arrived from the United Kingdom but without drilling tools; they have since been put to work with tools and accessories borrowed from other rigs in order to reduce the considerable number of outstanding applications for boreholes. Sixty-seven boreholes with an aggregate depth of 12,171 feet were completed and four were still in the course of being drilled at the end of the year. Thirty-six of the boreholes drilled in 1947 were successful (yielding more than one thousand gallons per hour) and on test gave a total delivery of 5,260,000 gallons per day. The following table shews the number of boreholes drilled during the quinquennium 1943-1947, for private individuals (mainly for irrigation), for Government and for the War Department :—

	<i>No. of Boreholes Drilled</i>				
	<i>1943</i>	<i>1944</i>	<i>1945</i>	<i>1946</i>	<i>1947</i>
Private individuals	—	—	—	—	—
Government	25	34	56	61	35
War Department	20	23	16	3	17
War Department	10	4	—	19	15
Totals	55	61	72	83	67
Aggregate footage drilled	7,964	9,115	12,785	11,686	12,171

10. Of the 35 boreholes for private purposes, 18 were drilled under the Government subsidized scheme at a cost of £20 or £32. 10s. to the hirer and the remainder on repayment of the full cost plus departmental charges. The western Mesaoria being the area from which the largest number of applications for private boreholes arose, was well served with twenty-six new boreholes, twelve of which were drilled to tap the recently discovered aquifers of the Argaki, Zodhia and Kato Kopia areas and gave yields of from 4,000 to 10,000 gallons per hour. Military requirements have again been heavy and fifteen boreholes were drilled, principally in connection with water supply to the Karaolos and Xylytymbou Illegal Jewish Immigrants' Camps. Most of the boring for Government purposes has been in the general course of prospecting and is dealt with elsewhere but three successful boreholes were completed at Kondea, Morphou and Lefka for nursery gardens of the Agricultural Department.

11. During the year records of 1,305 boreholes drilled in Cyprus from 1925 to the end of 1947 were assembled and indexed. Of these boreholes, 1,060 were drilled by Government, 38 by the Army, 36 by a private contractor and 171 in the course of seismic geophysical prospecting by an oil exploration company. This classification has formed an invaluable guide to the sub-surface hydrology of the Island and in particular in assessing the possibilities of developing ground-water in any particular locality.

12. PROSPECTING : In view of the considerable demand for boreholes for private and military purposes, Government prospecting has again been on a reduced scale. Five boreholes were put down in the Larnaca, Livadhia and Kellia areas and the waters of a large number of nearby wells were sampled for analysis in connection with water supply to the proposed electrification scheme power station. Unfortunately all waters were found to be of too high salinity and hardness. Search for ground-water to supply the Kantara summer resort has also been of no avail owing to shallow penetration of the Trypa limestones in three boreholes to pass into thick clays without reaching water-table. Exploration of the easterly extension of the Syrianokhori-Morphou aquifers has already been referred to with the drilling of a number of large yielding boreholes at Kato Kopia, Argaki, Zodhia and Astromeritis, the results of which indicate a promising future for pumped irrigation to the fertile lands of the area. A borehole commenced in 1946 near Laxia has been completed and during a prolonged pumping test gave a delivery of 6,500 gallons per hour without draw-down of water level. The southerly continuation of the Athalassa aquifers by at least a mile is thereby proved and a valuable potential source of water for Nicosia assured. Deep well pumps powered by diesel engines have been in constant demand on hire from the department in order to determine the yield of, and to enable the deepening of numerous privately owned wells.

13. MISCELLANEOUS : As the execution of works has proceeded, plans for similar future works have been formulated and estimates of cost prepared both in the irrigation and domestic water supply spheres. In order to further these plans it has become evident that in many cases amended legislation is necessary in order to acquire privately-owned water for the public utility of village domestic supply. At a number of villages it has been impossible to find water of adequate quantity and quality within the village area to serve the domestic requirements and there has been reluctance on the part of neighbouring villages to permit water to be taken from sources within their areas. To overcome such difficulties, draft legislation has been submitted to Government, seeking powers to acquire such surplus water as may be required, when purchase by inter-village agreement cannot be achieved.

14. With the failure of the Nicosia electricity supply in October and consequent lack of power for operation of pumps, the supply of water to consumers in the town generally fell to approximately 40% of normal. Immediate action was taken to replace electrical prime-movers with diesel engines and within 24 hours the supply of water was at 80% of normal and full supply was restored within two days.

15. EXPENDITURE : The total departmental expenditure in 1947 from all sources was £225,223, and the amount spent on Personal Emoluments, including War Bonus, was £15,078. Water supply work of one kind or another was undertaken in 177 villages out of a total of 647 in the Island.

APPENDIX I.

IRRIGATION SCHEMES, 1947.

No.	Place	Donums	
		Winter & Spring	Summer
1	Agridhia *	—	5
2	Akaki	—	10
3	Akrounda *	350	50
4	Alaminos	30	—
5	Alekhtora	—	—
6	Alithinou *	—	85
7	Alona *	—	223
8	Anatoliko	—	30
9	Angastina *	2,000	—
10	Arakapas	—	300
11	Arminou	—	60
12	Arsos (Limassol)	—	80
13	Asha ..	50	—
14	Askas	—	43
15	Ayios Amvrosios (Kyrenia)	1,000	—
16	Ayios Ermolaos	100	—
17	Ayios Ioannis (Agros)	—	30
18	Ayios Konstantinos *	200	140
19	Ayios Nikolaos (Meletze) *	—	4
20	Ayios Pavlos	—	50
21	Ayios Photios *	—	15
22	Ayios Theodoros (Larnaca) †	—	—
23	Ayios Theodoros (Limassol)	—	20
24	Ayios Theodoros (Soleas) ..	—	130
25	Ayios Thomas *	—	40
26	Ayii Vavatsinias	—	80
27	Dhierona	—	200
28	Dhymes	—	15
29	Ephthagonia †	—	—
30	Episkopi (Paphos)	—	80
31	Exometokhi †	—	—
32	Galini *	400	50
33	Geunyeli †	—	—
34	Gourri	—	250
35	Gypsos	1,000	—
36	Kaimakli *	400	—
37	Kalavastos †	—	—
38	Kalokhorio (Klirou) *	1,000	250
39	Kalokhorio (Limassol)	—	60
40	Kalopanayiotis *	—	120
41	Kambos *	—	10
42	Kambi (Pharmakas)	—	100
43	Kambyli	—	40
	Carried forward ..	6,530	2,570

* Area irrigated additional to that shown in 1946 Annual Report.

† Repairs to existing irrigation works.

IRRIGATION SCHEMES, 1947.—*continued.*

No.	Place	Donums	
		Winter & Spring	Summer
	Brought forward	6,530	2,570
44	Kato Arodhes *	—	30
45	Kato Lefkara	500	—
46	Kato Mylos	—	70
47	Khandria *	—	63
48	Kilani †	—	—
49	Klirou	—	100
50	Kophinou *	—	100
51	Kouris River *	1,000	—
52	Lagoudhera	—	9
53	Lefkoniko *	950	—
54	Livadhia (Nicosia)	—	120
55	Louvaras	—	20
56	Lymbia	200	50
57	Lythrodhonda †	—	—
58	Mandria (Limassol)	—	—
59	Mandria (Paphos)	—	300
60	Mazotos	800	—
61	Melini *	60	500
62	Mia Milea †	—	—
63	Mitsero	600	—
64	Odhou	—	52
65	Ora	—	20
66	Orga	—	10
67	Palekhorí (Morphou) *	—	30
68	Palekhorí (Orinis) *	—	44
69	Pano Lefkara *	500	70
70	Paramali	200	—
71	Pedieos River	5,000	—
72	Petra	2,000	250
73	Philousa (Khrysokhou)	—	40
74	Phlasou	—	120
75	Phterykha	50	14
76	Phterykoudhi	—	34
77	Pileri	—	8
78	Platani	80	—
79	Platanistasa	—	83
80	Polis (Gastrapi) *	300	100
81	Polystipos *	—	85
82	Potamia	—	4
83	Potamitissa *	—	45
84	Psilatos *	10	—
85	Pyrgos (Limassol)	250	50
86	Silikou	—	20
	Carried forward	19,030	5,011

* Area irrigated additional to that shewn in 1946 Annual Report.

† Repairs to existing irrigation works.

IRRIGATION SCHEMES, 1947.—*continued.*

No.	Place.	Donums.	
		Winter & Spring	Summer
	Brought forward	19,030	5,011
87	Spilia	—	50
88	Syngrasis *	—	—
89	Terra	—	450
90	Theletra	—	80
91	Trimithousa (Khrysokhou)	—	5
92	Vatili	1,200	—
93	Vitsadha	200	—
94	Zoopyi †	—	75
95	Drilling	—	1,000
	Total	20,430	6,671

* Repairs to existing irrigation works.

† Area irrigated additional to that shown in 1945 Annual Report.

APPENDIX II.

DOMESTIC WATER SUPPLY WORKS COMPLETED IN 1947.

Village	Population (Census 1946)
1. Analiondas	207
2. Anglisidhes	578
3. Asgata	708
4. Askas	439
5. Ayia Irini	368
6. Ayia Varvara (Paphos)	228
7. Dhali	1,964
8. Episkopi (Limassol)	1,236
9. Kalokhorio (Larnaca)	659
10. Kaminaria	536
11. Kantara	(Summer Resort)
12. Kharcha	555
13. Kivisil	206
14. Klepini	329
15. Kormakiti	899
16. Layia	119
17. Limnatis	616
18. Livadhia (Nicosia)	191
19. Mallia	706
20. Moniatis	342
21. Phasoula (Limassol)	523
22. Philousa (Khrysokhou)	241
23. Trimiklini	335
24. Vavatsinia	295
25. Zoopyi	306
26. Zyyi	98
Total	12,684

DOMESTIC WATER SUPPLY WORK BEGUN IN 1947 AND STILL
IN HAND.

<i>Village</i>	<i>Village</i>
1. Androlikou	12. Kato Dhrys
2. Athienou	13. Kato Mylos
3. Ayios Athanasios	14. Mesayitonia
4. Ayios Epiphanos (Orinis)	15. Moutayiaka
5. Ayios Theodoros (Limassol)	16. Patriki
6. Chakistra	17. Pentalia
7. Dhiorios	18. Perapedhi
8. Geunyeli	19. Phlamoudhi
9. Kalogrea	20. Pretori
10. Kambos	21. Sarama
11. Karmi	22. Vasa (Limassol)

DOMESTIC WATER SUPPLY.

PRELIMINARY DEVELOPMENT WORK COMPLETED IN 1947.

<i>Village</i>	<i>Village</i>
1. Angastina	11. Larnaka tis Lapithou
2. Anoyira	12. Pano Koutraphas
3. Gaidhouras	13. Peyia
4. Gouphe	14. Prastio (Famagusta)
5. Kalopanayiotis	15. Pyrgos (Limassol)
6. Kannaviou	16. Trikomo
7. Khlorakas	17. Trimitousa
8. Klirou	18. Vavla
9. Kouka	19. Voroklini
10. Kouklia (Paphos)	

DOMESTIC WATER SUPPLY.

PRELIMINARY INVESTIGATIONS CARRIED OUT AND ESTIMATES OF COST
PREPARED IN 1947.

<i>Village</i>	<i>Village</i>
1. Aradhippou	19. Pano Arodhes
2. Ayia Irimi	20. Paramali
3. Ayios Amvrosios (Kyrenia)	21. Pentalia
4. Ayios Isidoros	22. Phterykha
5. Ayios Vasilios	23. Plataniskia
6. Dhiorios	24. Polystipos
7. Dhymes	25. Prastio (Limassol)
8. Eliophotes	26. Pyla
9. Erimi	27. Sanidha
10. Istinjo	28. Strongylos
11. Kalopanayiotis	29. Terra
12. Klavdhia	30. Timi
13. Kouklia (Paphos)	31. Trapeza
14. Linou	32. Trypimeni
15. Mandria (Paphos)	33. Yerani
16. Mathikoloni	34. Yerovasa
17. Monagroulli	35. Ypsonas
18. Pakhyammos	