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Research Article

Well inventory Data Analysis (WIDA) of Byramangala Watershed, Bangalore Urban District, Karnataka, India

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Abstract

The Study area is bounded between latitude 120 45'00'' N to 130 00'00'' N and longitude 770 23' 00''E to 770 35' 00'' E in Toposheet Nos. 57 H/5 and 57 H/9. The study of bore well inventory data in byramangala area is carried out and data of 142 bore wells were collected. The minimum depth of bore wells drilled is 80 m and maximum depth drilled is 1500 m. The minimum inserted casing is 40 m and maximum is 200 m. The minimum yield of groundwater is 2 inches and 3 inches pre-monsoon and post-monsoon seasons respectively. Whereas, maximum yield of groundwater observed in bore wells are 3 inches and 5 inches in pre-monsoon and post-monsoon seasons respectively. The bore well inventory analysis reveal that 68% of bore wells having good yield and 44% having low yield in pre-monsoon season whereas, in post-monsoon season 98% of bore wells having good yield and 8% having low yield.

Keywords: *Bore well, Inventory, Yield, Byramangala and groundwater*

1. Introduction

In newly developed area in many villages, town and cities in rural areas of our country, groundwater is the major source of water for drinking, domestic, agriculture and industrial purposes. The demand of water increasing rapidly and would continue to increase in future. That necessitates the estimation and management of water to fulfill the increasing demand (Karanth, 1987). This study deals with position of aquifer and its fluctuation recorded during pre and post monsoon seasons in the area. The increasing in demand of water results into exploration of water resources. The crude methods applied for exploration of aquifer are proved to be very poor. Therefore the planning and operation of new sites, the scientific approach is necessary (Sawant and Joshi, 1999). The authors had made an attempt to investigate groundwater by using the available data and scientific information obtained to enhance the yield of bore wells in Byramangala area. The data obtained in the study area is unconfined aquifer (Todd, 1980 and Kruseman and De Rider, 1983).

Study area

The study area is bounded between latitude 12^0 45'00'' N to 13^0 00'00'' N and longitude 77^0 23' 00''E to 77^0 35' 00'' E in Toposheet Nos. 57 H/5 and 57 H/9. (Fig.1). The area receives moderate rainfall of about 600 mm/year. In general the altitude variation from West to East is between 693m and 77m. However, the area studied shows an altitude of 661.30m, which is situated in the South - Western corner with gently sloping towards North and North - Eastern direction. The low lying region is situated in North - East direction with an altitude of 647m above M.S.L.

The altitude 693m, 588m, 580m and 578m is observed in western part of the area. The altitude difference observed in the area. Investigated is 14.30 m. The streams are flowing from the higher altitude towards East before joining the Vrishabhavati River. **(Fig.1)**

Methodology

The bore well inventory data were collected from 142 private bore wells during pre and post monsoon seasons (Fig.1). These bore wells are fitted with submersible pump of 1 H.P. or 0.5 H.P. The yield of bore wells was measured by using 900 Vee notch methods (Despande, 2003). In bore well inventory it is observed that the minimum depth of bore wells drilled is 80 m and maximum depth drilled is 1500 m. The minimum inserted casing is 40 m and maximum is 200 m. The minimum yield of groundwater is 2 inches and 3 inches pre-monsoon and post-monsoon seasons respectively. Whereas, maximum yield of groundwater observed in bore wells are 3 inches and 5 inches in pre-monsoon and post-monsoon seasons respectively. **(Table No.1).**

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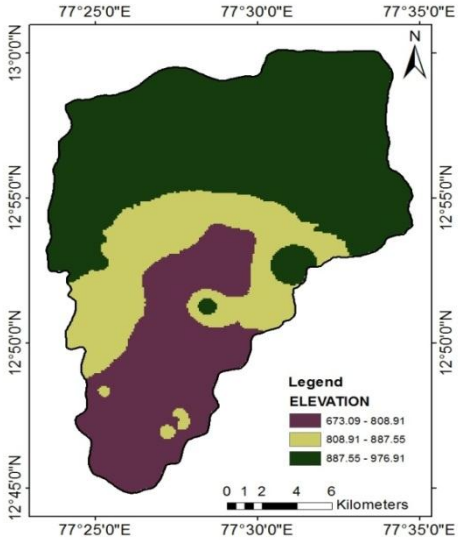
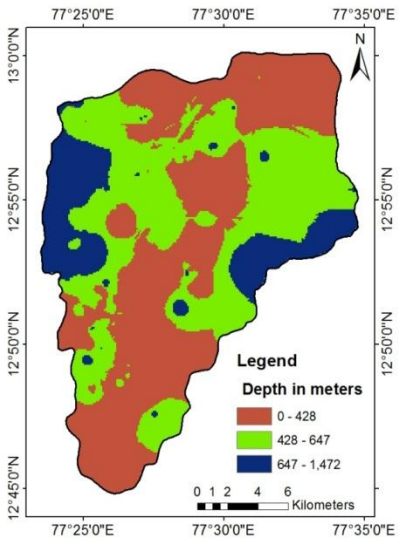
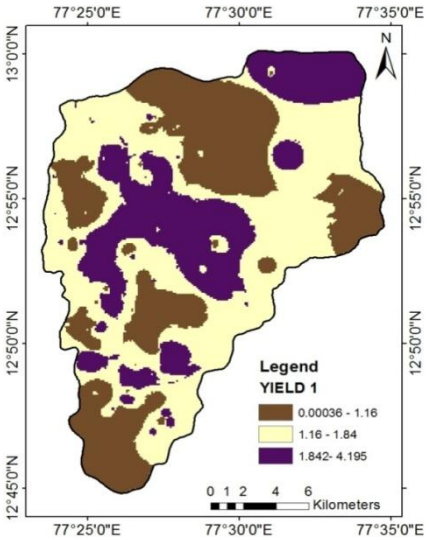


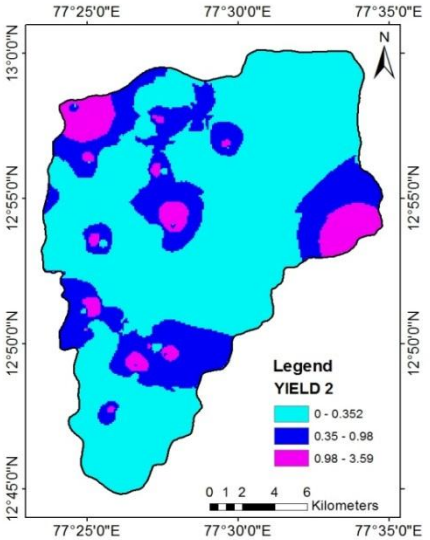
Elevation of the study area



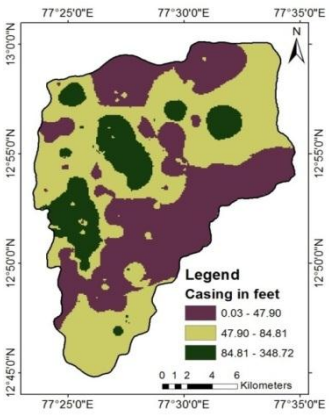
Depth of the study area



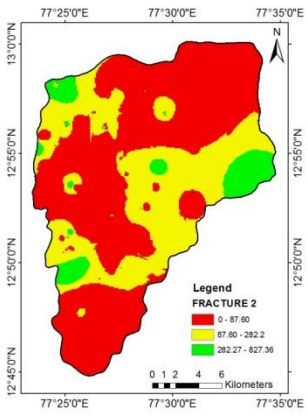
Yield-1 of the study area



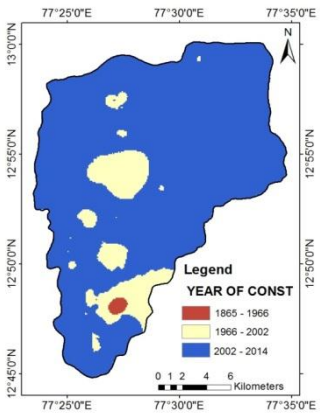
Yield -2 of the study area



Casing of study area



Fracture 2 of the study area



Year of const of study area

Fig.1 Various map of the study area

Table 1 Well inventory data analysis

Village	Lat	Long	Elevation M	Type of well	Year of construction	Depth_drilled (ft bgl)	Casing(ft bgl)	Fracture1(m bgl)	Yield1 (inches)	Fracture2 (m bgl)	Yield2 (inches)
Hejjala	12.86	77.43	854	BW	2014	354	60	180	3	0	0
Hejjala	12.86	77.42	880	BW	2013	550	200	400	1	500	2
Hejjala	12.86	77.43	881	BW	2010	600	150	440	2	0	0
Devalingianapalya	12.85	77.42	881	BW	2010	550	80	450	1	0	0
Devalingianapalya	12.85	77.42	869	BW	2002	300	100	90	1.5	300	3
Ainurpalya	12.84	77.42	831	BW	2002	0	0	0	0	0	0
Ainurpalya	12.84	77.42	829	BW	2014	500	50	400	2	430	2.5
Ainurpalya	12.84	77.42	821	BW	2014	0	0	0	0	0	0
sheahagirihalli	12.84	77.42	854	BW	2014	0	0	0	0	0	0
Kanminakae	12.86	77.43	880	BW	2014	0	0	0	0	0	0
Kanminakae	12.86	77.43	874	BW	1992	280	60	240	3	0	0
Kanminakae	12.87	77.43	862	BW	1992	800	100	600	2	0	0
Kanminakae	12.87	77.43	859	BW	1994	800	300	400	3	0	0
Gerupalya	12.88	77.44	865	BW	2012	530	80	100	2	0	0
Gerupalya	12.89	77.44	865	BW	2013	600	0	0	0	0	0
Ramohalli	12.91	77.42	889	BW	2013	430	50	350	2	0	0
Ramohalli	12.91	77.41	891	BW	2012	530	0	0	0	0	0
Ramohalli	12.91	77.41	895	BW	2012	500	85	0	0	0	0
Doddhaladamara	12.91	77.39	925	BW	2012	700	64	250	0.5	550	2
Doddhaladamara	12.91	77.39	920	BW	2012	600	40	580	2	0	0
Kethalli	12.91	77.40	916	BW	2010	750	45	620	2	0	0
Kethalli	12.91	77.40	915	BW	2014	860	60	460	1.5	0	0
Chikkalur	12.89	77.42	874	BW	2014	1000	120	400	2.5	0	0
Chikkalur	12.89	77.42	877	BW	2006	450	120	280	3	0	0
Chikkalur	12.89	77.42	894	BW	2012	770	100	400	2.5	650	3
Kolur	12.89	77.41	895	BW	2012	600	70	450	2	0	0
Kolur	12.89	77.41	898	BW	2014	580	80	300	0	0	0
Lakkayanapalya	12.89	77.40	901	BW	2013	800	40	400	1.5	0	0
Lakkayanapalya	12.89	77.40	927	BW	2013	1400	80	900	2	0	0
Subbarayanapalya	12.88	77.42	895	BW	2014	750	60	730	2	0	0
Subbarayanapalya	12.88	77.42	889	BW	2014	800	150	700	2	0	0
Guruganjanahalli	12.94	77.42	906	BW	2012	700	35	200	1.5	600	2.5
Guruganjanahalli	12.94	77.42	913	BW	2010	700	0	0	0	0	0
Krishnasagara	12.94	77.43	919	BW	2015	730	64	340	2.5	0	0
Krishnasagara	12.94	77.43	921	BW	2015	700	65	420	1.5	0	0
Margondanahalli	12.94	77.43	913	BW	2015	650	110	470	2.5	0	0
Margondanahalli	12.94	77.43	917	BW	2015	650	65	450	3	0	0
Sulikere	12.94	77.45	912	BW	2011	450	100	280	2.5	0	0
Sulikere	12.94	77.45	906	BW	2012	495	100	300	3	0	0
Sulikere	12.94	77.45	909	BW	2012	500	80	380	0	500	0
Bairahalli	12.93	77.45	904	BW	2012	800	90	570	1.25	0	0
Bairahalli	12.93	77.45	904	BW	2012	460	80	260	2	0	0
Komgatta	12.93	77.46	889	BW	2000	415	150	150	2	250	3
Komgatta	12.93	77.46	901	BW	2000	600	150	500	3	0	0
Challagatta	12.90	77.46	864	BW	2000	450	60	280	3	0	0
Challagatta	12.90	77.46	859	BW	1970	400	65	260	1	0	0
Babasabapalya	12.90	77.46	831	BW	1994	630	200	80	2	300	4
Babasabapalya	12.90	77.46	812	BW	1994	600	180	450	3	0	0
Mariyappanapalya	12.95	77.49	934	BW	2005	600	150	520	1	0	0
Mariyappanapalya	12.95	77.49	927	BW	2009	800	150	380	1	460	2
Doddhabasthi	12.94	77.47	909	BW	2014	600	0	0	0	0	0
Doddhabasthi	12.94	77.47	899	BW	2014	0	0	0	0	0	0
Ramasandra	12.94	77.47	912	BW	2010	600	60	120	2	0	0
Sonnehalli	12.94	77.48	925	BW	2010	350	60	0	1	0	0

Sonnehalli	12.94	77.48	918	BW	2010	550	100	450	1.5	0	0
Nagadevanahalli	12.94	77.49	914	BW	2010	0	0	0	0	0	0
Nagadevanahalli	12.94	77.49	913	BW	2010	0	0	0	0	0	0
Kamakshipalya	12.99	77.52	938	BW	2014	450	40	80	4	0	0
Kamakshipalya	12.99	77.52	937	BW	2014	400	40	120	3	0	0
Kottigepalya	12.99	77.52	949	BW	2000	340	60	250	3	0	0
Kottigepalya	12.99	77.52	966	BW	2001	340	60	250	3	0	0
Beggar Colony	12.99	77.52	967	BW	2005	0	0	0	0	0	0
Papareddypalya	12.97	77.51	964	BW	2005	0	0	0	0	0	0
Papareddypalya	12.97	77.51	977	BW	2013	700	60	100	0	0	0
Bimanakuppae	12.90	77.44	879	BW	2000	200	40	60	3	0	0
Bimanakuppae	12.90	77.44	884	BW	1995	210	40	40	2.5	0	0
Malligondanahalli	12.91	77.41	908	BW	2014	800	200	800	0	0	0
Malligondanahalli	12.91	77.41	906	BW	2005	650	0	0	0	0	0
Ganapathihalli	12.92	77.39	928	BW	2005	1500	80	1000	2.5	0	0
Ganapathihalli	12.92	77.39	926	BW	2005	1500	100	800	0.5	1200	1
Basavanapalya	12.93	77.40	936	BW	2014	1000	60	650	2	0	0
Basavanapalya	12.93	77.40	938	BW	2014	1200	0	800	0	0	0
Yellachikupae	12.96	77.42	941	BW	2014	550	98	220	2	380	3
Yellachikupae	12.96	77.42	924	BW	2006	415	160	100	1	300	1
Lakuppae	12.97	77.41	948	BW	2014	1000	60	750	1	900	2.5
Lakkupae	12.97	77.41	959	BW	2013	400	40	370	2	0	0
Lakkupae	12.97	77.41	959	DW	2013	80	0	0	0	0	0
Gollarahatti	12.85	77.47	945	BW	2012	800	50	795	0	0	0
Kenchanapura	12.96	77.45	904	BW	1985	250	0	120	0	0	0
Kenchanapura	12.96	77.45	913	BW	2007	270	70	160	1.5	250	0
kannahalli	12.96	77.45	930	BW	2007	720	60	0	3	0	0
kannahalli	12.96	77.46	921	BW	1993	280	60	60	1	120	1.5
Hosahalli	12.96	77.45	924	BW	2010	450	60	60	0.5	250	2
Hosahalli	12.96	77.45	927	BW	2014	770	0	200	2	0	0
Seegehalli	12.97	77.45	960	BW	2015	700	0	220	2	0	0
Seegehalli	12.97	77.45	964	BW	2015	0	0	0	0	0	0
Kodihalli	12.97	77.46	959	BW	2015	0	0	0	0	0	0
Bang University	12.94	77.51	930	BW	2015	350	0	0	0	0	0
Bang University	12.94	77.50	928	BW	2014	400	80	200	0	0	0
Nayandalli	12.94	77.52	941	BW	2014	680	150	550	3	0	0
Bidadi	12.87	77.45	719	BW	2014	0	0	0	0	0	0
Bidadi	12.87	77.45	771	BW	2014	0	0	0	0	0	0
Thagachiguppe	12.87	77.45	772	BW	1984	140	40	60	0	75	0
Thagachiguppe	12.87	77.45	770	BW	2014	480	75	180	6	220	0
Thagachiguppe	12.87	77.45	759	BW	2010	0	0	0	0	0	0
Devagere	12.86	77.45	786	BW	2014	380	80	180	0	0	0
Kodipalya	12.91	77.49	838	BW	2013	480	30	360	4	460	0
Konasandra	12.89	77.49	780	BW	1996	150	30	0	0	0	0
Konasandra	12.89	77.48	777	BW	2015	320	90	100	3	130	0
Hemmegepura	12.87	77.48	793	BW	2007	300	40	100	2.5	210	0
Hemmegepura	12.88	77.48	786	BW	2008	300	50	110	2.5	220	0
H Gollahalli	12.88	77.48	776	BW	2014	300	80	200	1.5	0	0
H Gollahalli	12.87	77.48	777	BW	2014	1120	0	700	2	0	0
H Gollahalli	12.87	77.48	768	BW	2005	40	0	25	2.5	350	0
sheshagirihalli	12.84	77.42	813	BW	2014	720	400	0	4	0	0
sheshagirihalli	12.84	77.42	843	BW	2013	800	11	150	2	350	0
Manchanayakanahalli	12.82	77.42	840	BW	2014	750	0	100	4	750	0
Manchanayakanahalli	12.83	77.42	846	BW	1995	350	0	250	0	300	0
Ampapura	12.83	77.43	833	BW	2013	650	120	430	1.5	650	0
Pinchagundanpalya	12.80	77.42	810	BW	2010	800	30	380	2.5	0	0
Pinchagundanpalya	12.81	77.42	823	BW	2013	0	0	0	0	0	0
Parasanapalya	12.80	77.42	816	BW	2015	480	67	250	0	0	0
Parasanapalya	12.80	77.42	800	BW	2014	525	104	380	0	0	0
Shyanamangala	12.80	77.43	777	BW	2002	315	62	60	2	195	1.5
Shyanamangala	12.79	77.43	763	BW	2012	300	70	220	0	0	0
Chik kuntanahalli	12.79	77.44	710	BW	2013	310	70	250	0	0	0

Chik kuntanahalli	12.79	77.46	793	BW	2013	550	100	100	0	0	0
Marilamidoddi	12.79	77.46	800	BW	2014	430	60	300	0	0	0
Narayanpura	12.79	77.46	833	BW	2014	500	40	300	4	0	0
voddarapalya	12.79	77.46	837	BW	2014	750	90	500	2.5	0	0
Kodiyala	12.78	77.45	827	BW	2014	450	100	390	2	0	0
Panchipura	12.77	77.43	673	BW	2014	120	50	80	0	0	0
Chinnakurchi	12.83	77.46	750	BW	2006	240	80	200	3	0	0
Chinnakurchi	12.83	77.46	750	BW	2014	488	100	380	3	450	3
Gonipura	12.83	77.45	732	BW	2014	0	0	0	0	0	0
Chinnakurchi	12.83	77.46	748	BW	1995	300	0	250	2.5	0	0
Gonipura	12.83	77.45	743	BW	1995	350	40	70	0	0	0
Gonipura	12.83	77.45	755	BW	2014	1000	0	900	1.5	250	2
Gonipura	12.83	77.45	750	BW	1995	200	0	40	1	80	1.5
Parasanapalya	12.80	77.45	714	DW	1865	35	25	0	0	0	0
Parasanapalya	12.80	77.44	726	BW	2012	280	15	280	3	0	0
Parasanapalya	12.81	77.44	720	DW	1945	72	25	0	0	0	0
Parasanapalya	12.81	77.44	726	BW	1995	450	65	400	2.5	0	0
Baichohalli	12.81	77.44	720	BW	2014	550	0	250	2.5	0	0
Tippuru	12.82	77.44	721	BW	2015	460	60	450	4	0	0
Bandepalya	12.82	77.44	712	BW	2010	280	40	120	1	200	2
Lingapura	12.82	77.44	730	BW	2012	550	80	528	2	0	0
Lingapura	12.82	77.44	734	BW	2011	250	0	40	1.5	250	2.5
Kumblugudu Gollhalli	12.84	77.45	738	BW	1990	180	0	100	0	0	0
Talchenahallu	12.90	77.62	923	BW	1990	850	75	750	1.5	0	0
Vasanthppura	12.89	77.56	905	BW	2010	730	0	630	1	730	2
Chikkegoudanapalya	12.88	77.51	962	BW	2014	1170	0	700	1	0	0

Results and Discussion

The study of bore well inventory data in Byaramangala area was carried out and data of 142 bore wells were collected. The bore well inventory analysis reveal that 66% of bore wells having good yield and 34% having low yield in pre-monsoon season whereas, in post-monsoon season 92% of bore wells having good yield and 8% having low yield. The minimum yield of groundwater is well inventory data in minimum depth of bore wells drilled is 80 m and maximum depth drilled is 1500 m. The minimum inserted casing is 40 m and maximum is 200 m. The minimum yield of groundwater is 2 inches and 3 inches pre-monsoon and post-monsoon seasons respectively. The geological and structural aspects play an important role for deeper basaltic aquifers in the study area.

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