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SOCIO-ECONOMIC BACKGROUND OF THE HEAD AND TRANSITIONAL REGIONS OF THE KELANI RIVER BASIN, SRI LANKA

M.G.Y.L. MAHAGAMAGE AND PATHMALAL M. MANAGE*

Centre for Water quality and Algae Research, Department of Zoology
University of Sri Jayewardenepura, Gangodawila, Nugegoda, Sri Lanka

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Key words *: Kelani river basin, Questionnaire survey, Socio-economic background*

Abstract– Kelani river basin covers nearly seven districts and 36 divisional secretariats including twenty main sub basins. The present study was aimed at understanding the public awareness about water quality in the Kelani river basin through questionnaire survey. In this context, information was recorded from head and transitional regions of the river basin using questionnaire survey whereas the background information of the river basin was collected from relevant government authorities and published research articles. A total of hundred participants were interviewed for the survey and other related information was taken from Central Environmental Authority (CEA), Survey Department and Department of Census and Statistics in Sri Lanka. Results of the study revealed that, majority of participants were with good literacy and most of them drink spring water (53.8%), 20% consume well water and the rest consumed national or village level water schemes for their drinking requirement. Among them 44.3% consume boiled water, especially in spring water consumers and 28.3% of the community drink water without any treatment. It was found that 70% of respondents used garbage pits to dump their domestic waste and release waste water directly to their own land or small tributaries nearby within the premises of the river basin. Live stock production of the river basin is cattle milk, buffalo milk and egg and the average production of each was 47000 l/day, 12500 l/day and 25500 eggs/day respectively. According to the CEA, Kelani river basin consists of around 9000 industries and the highest number of industries are located in Gampaha District. Kelani river provides many more benefits for in habitants who live within the river basin. Therefore, controlling or minimizing impacts on the river basin is necessary. Unless immediate control actions are taken, pollution of both ground and surface water may cause severe problem in near future.

INTRODUCTION

Anthropological, industrial and agricultural activities have been identified as major sources of pollutants of rivers and streams. Such polluting agents may affect physical, chemical and biological parameters of water. The quality of surface water is a major factor affecting human health and ecological systems, especially around urban areas, since rivers and their tributaries passing through cities receive a multitude of contaminants released from industrial, domestic/sewage and agricultural effluents (Qadir *et al*., 2008). Sri Lanka's river system comprising 103 rivers flowing from the central highlands makes up a total collective length of about 4560 km and its covering total length is 59245 km^2 (MOFE 2001). The river basins in Sri Lanka vary in sizes from 9 km^2 to 10,000km^2 and runoff estimated that 42 million acre foot (Manchanayaka and Maddumabandara 1999).

The Kelani river basin drains an area of 2,230 km^2 initiating at levels above 1,500 m on the steep slopes of the western border of the central highlands. It is the fourth longest river in Sri Lanka (144m) and a number of tributaries travels through deep and structurally controlled valleys in the basin (IGES, 2007). River basin covers nearly seven districts starting from the central highlands (Nallathanniya) and ends in the western part of the country (Mattakkuliya). Around 25% of population among total population lives within the basin (Mahagamage and Manage 2015) and the river provides about 80% of the drinking water supply to the capital city Colombo (Mahagamage and Manage 2014). In addition, it provides biodiversity, space for

***Corresponding author's email:** pathmalal@sjp.ac.lk

more than 9000 industries, agricultural activities, power generation, recreation, fisheries, livestock, gem and sand mining, tourism and many more benefits. As the river flows down,pollutants from anthropological and industrial activities and land use practices within the river basin add different hazardous chemicals and microbes to water (Mahagamage and Manage, 2014). The major wastewater generating industries are located in the river basin and it was recorded that industrial waste water is released to the river or tributaries (Danish Hydraulic Institute 1999). Therefore, it has been estimated that the surface water receives 36,000 kg/day of COD and 2,000 kg/day of BOD (Lagerblad, 2010; Danish Hydraulic Institute, 1999). Thus, the Kelani river can be ranked as the largest recipient of the industrial effluents among all the other rivers in Sri Lanka. It was documented that major wastewater generating industries within the premises of the river basin are raw rubber factories, rubber latex factories, textile industries, food and beverage industries, steel manufacturing factories, fertilizer manufacturing factories and industries of the Biyagama export promotion zone (Danish Hydraulic Institute, 1999). Further, agricultural areas are fed with non-systematic agrochemicals-application within the basin which results in increased water pollution (Dissanayake, 1985). These pollutants reduce the availability of the above mentioned advantages and it directly affects the value of the river basin. Therefore, attention of relevant authorities should paid to river basin management and proper consumption practices to improve sustainable utilizations of river basin and also to safeguard the people who utilize ground and surface water from Kelani river basin.

The information regarding the consumption pattern of water by people who live within the head and transitional regions of the river basin is limited. Thus, the main objective of the present study was to collect background information of the river basin and water handling ways of inhabitants in the river basin as the annual water consumption from the river basin continues to increase year by year.

MATERIALS AND METHODS

Study area

Geographical location of Kelani river basin is (Northern latitudes 6° 47' to 7° 05' and Eastern longitudes 79° 52' to 80° 13') within the area of 2230 km^2. The river basin covers nearly seven districts (Colombo, Gampaha, Kaluthara, Kegalle, Rathnapura, Nuwaraeliya and Kandy) and 36 divisional secretariats including twenty main sub basins (Figure 1, Table 1). It can be divided into three regions in order to facilitate understanding of the catchment behavior (Figure 2).

Questionnaire survey

A questionnaire survey was conducted to examine persons' usage of water, attitude and awareness of the pollution status of head and transitional regions of the Kelani river basin. A total of 100 people were interviewed to get their views about the water quality of Kelani river basin. A face to face interview was conducted to gather information in a friendly manner. Participants were selected randomly which included one person over 18 years of age representing one house unit and no further specific details were considered in selecting the survey responders. Questionnaire composed of open ended and closed ended questions including, personal details, source of water for recreational activities, amount of water consumption, treatment methods of water before consumption, drainage systems information in homes, pollution sources of water nearby area, quality of water schemes, health problems, farming and industrial usage of water, population and housing units of the river basin.

Some of the background information of the Kelani river basin was collected from Central Environmental Authority (CEA), Survey Department and Department of Census and Statistics in Sri Lanka.

Statistical analysis

Microsoft Excel 2007 and Minitab 15 version were used to analyze collected data from questionnaire survey. ArcGIS 10.0 software was employed for interpretation of collected data from government agencies.

RESULTS AND DISCUSSION

Questionnaire survey

Participants

Almost all the respondents were permanent residents (98%) of the Kelani river basin. Around 51% of the respondents were belongs to age group range of 31 to 50 years and they were more concern about drinking water and the environment. The other age group over 50 years also responded to the

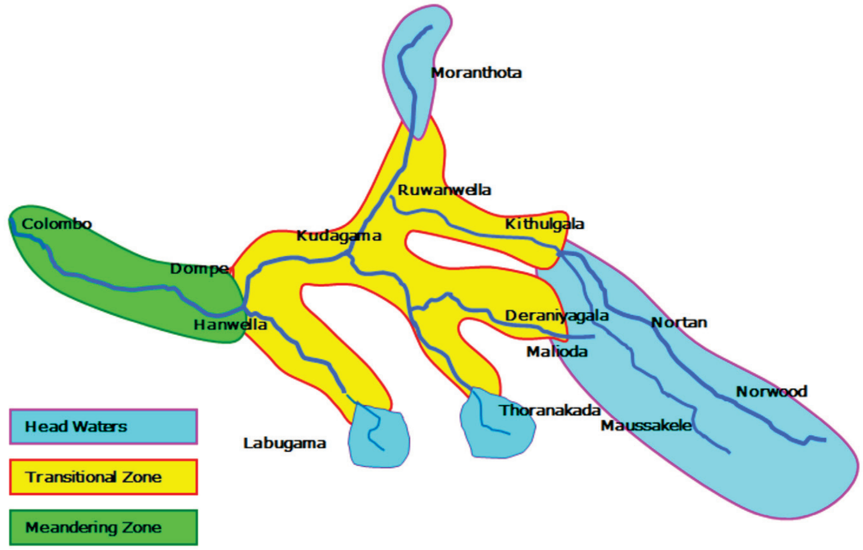

Fig. 1. Three regions of the Kelani river basin

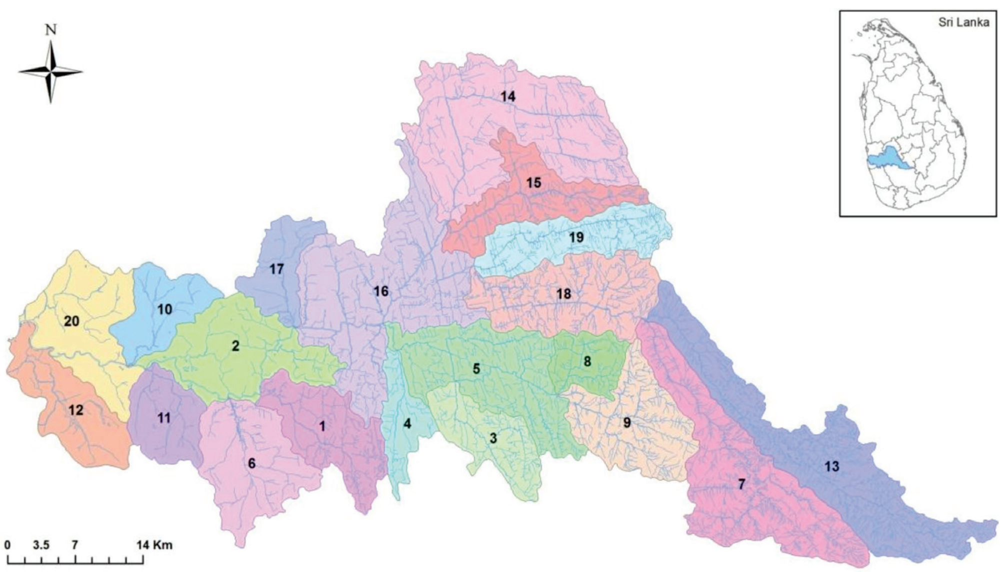

Fig. 2. Sub basin map of the Kelani river basin

questionnaire by covering 37% participants (Figure 3). The young group between 18 and 30 represented 11% of the total number of respondents. Central Bank of Sri Lanka (2015) documented that literacy of the Sri Lankans is 92.60% (2015). Therefore, 78.6% respondents have completed secondary education while 21.3% have received only primary education.

Water source for consumption

Majority of respondents consumed spring water (65.9%) for their day to day activities such as bathing, cooking and washing. Subsequently, 16.4% and 17.6% contributors used well-water and scheme-water respectively. Normally central highlands are rich in spring waters and most of the people who live in hilly regions depend on their own spring near homeland or public water schemes which supply water from spring sources. Further, Nichter (1985) documented that most of the villagers use different sources for drinking and bathing according to the clarity of water.

Major source of drinking water in head and transitional regions was spring water (53.8%), 20% of inhabitants consume well water and 19% use treated-water which is provided by National Water Supply and Drainage Board (NWSDB) and other national schemes (Figure 4). Among these, 38.1% participants drink less than 2L of water per day where 62% drink more than 2L of water per day. Valtin (2002) documented, that required amount of water for adults is around 2.5 liters daily in most instances, and therefore, majority of the participants were within the range of good level of water consumption.

In Sri Lanka, advice to drink boiled water is understood in the context of water borne diseases and the people's vulnerability to such diseases. However, it was found that majority of respondents believed that well-water is pure and therefore, they consume well water as it is. Hence, relevant parties of public health sector should take action to avoid water borne diseases (Nichter, 1985). It is known fact that the public health inspectors and family health officers have been encouraging people to drink boiled-water well over three decades in Sri Lanka (Nichter, 1985). Therefore, the results of the present study showed that awareness of public society is still needed. Majority of the participants (44.3%) practiced drinking of boiled-water and most of them were aware about eradication of pathogenic contamination in the process of boiling. It was found that 28.3% of respondents used water for drinking without any treatments whereas 27.4% used to drink water after filtering (Figure 5). Further, majority of the well-water consumers did not practice any treatment before drinking while spring water users practiced boiling and filtering process before drinking (Figure 6). Both spring and well water were ranked as poor category for drinking purposes according to the Canadian Council of Ministers of the Environment Water Quality Index (CCME WQI) (Mahagamage *et al.*, 2016a).

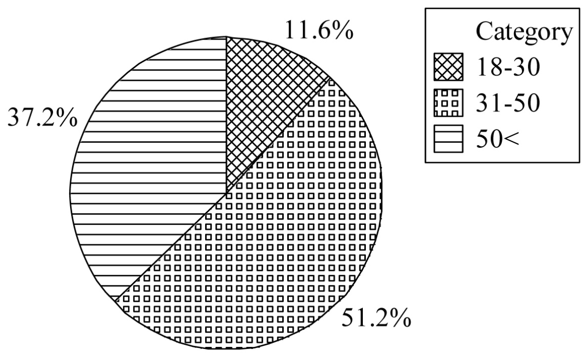

Fig. 3. Age categories of participants in the survey (Years)

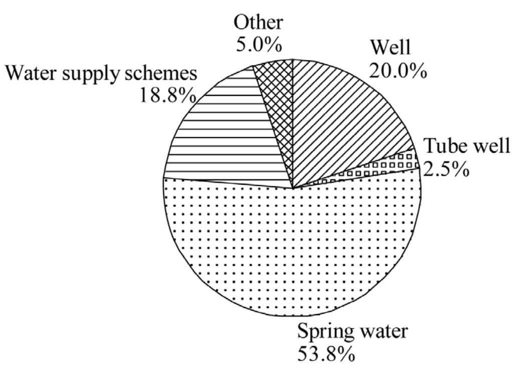

Fig. 4. Drinking water sources of the Kelani river basin

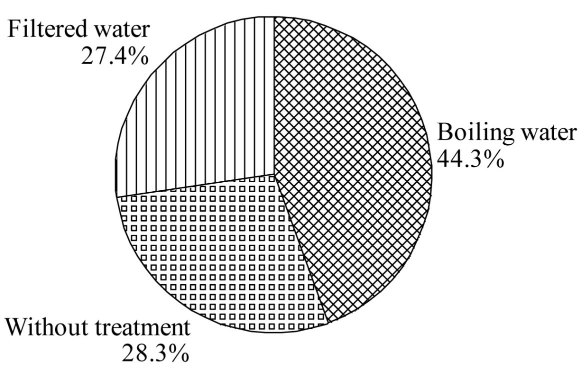

Fig. 5. Water purification practices followed by participants in the Kelani river basin

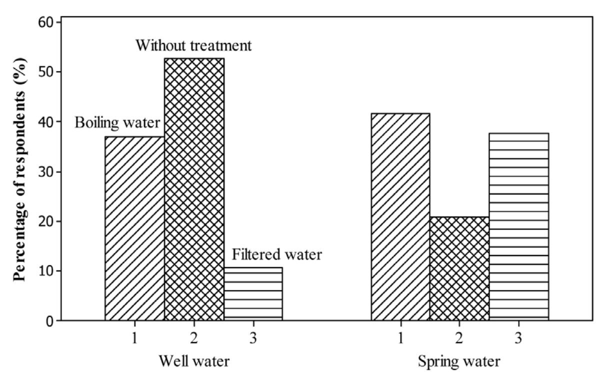

Fig. 6. Water purification practices related to water sources

Domestic waste management

The household generation of waste increasing with increase in income level was observed (Bandara, 2007). The present survey revealed that majority of the participants were middle income personals (Rs. 20,000 – 40,000/month). Therefore, generation of household waste is at a tolerable level and people manage their waste within their own lands. 70%

participants used to remove their domestic waste into their own garbage pit within the homeland. However, 20% handover their solid waste to the municipal councils (Figure 7) as they do not have sufficient space for their waste disposal.

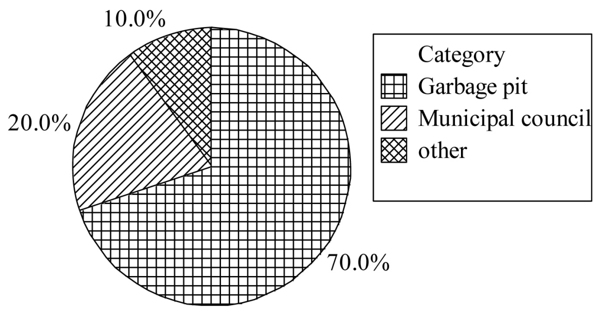

Fig. 7. Garbage removing methods of the household in the Kelani river basin

In many Asian urban cities, population growth has outpaced and therefore, improved sanitation and wastewater treatment facilityis a great challenge (Qadir *et al*., 2010; Raschid and Jayakody, 2009). The major problems concerning water resources in Sri Lanka are the pollution of water resource caused by various anthropogenic activities, especially inland surface waters are polluted heavily by domestic sewage (Bandara, 2003). With regard to present study it was revealed that 29% of respondents release their waste water into small tributaries nearby home and 30% of participants were in the practice of removing their domestic wastewater into their own land (Figure 8). Most of the respondents ranked domestic wastewater as the number one pollution source of the Kelani river and number two was industrial effluents. Agricultural waste and farm effluent waste were ranked as third and fourth

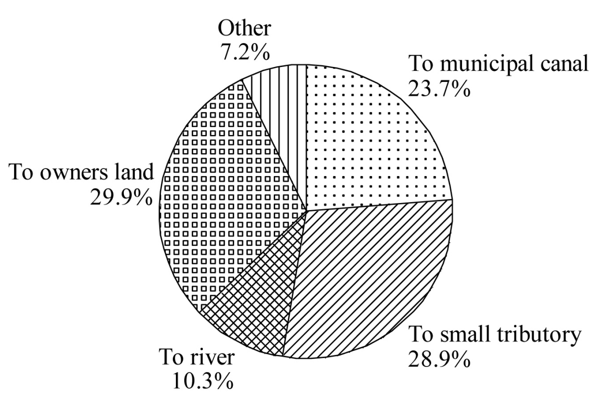

Fig. 8. Domestic waste water removing methods of the respondents in the Kelani river basin

places respectively (Figure 9). Lagerblad (2010) documented that the surface water receives 36,000 kg/day of COD and 2,000 kg/day of BOD from the industries located in the later part of the basin. Head region is mainly contaminated due to tea factories and line-rooms in the state sector with lot of sewage canals and factory wastes opening to the tributaries of the basin where rubber factories and their waste are the main source of pollution in the transitional region of the river basin (Mahagamage and Manage, 2014).

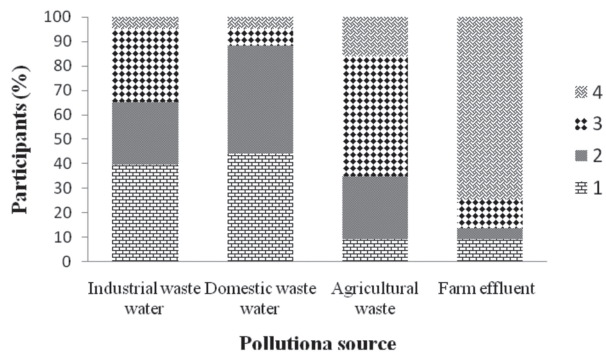

Fig. 9. Pollution sources of the Kelani river basin according to the rankings of respondents. Number 1 is the highest and 4 is the lowest

Water scarcity

According to the meteorology there are two main climatic seasons in the country and the Kelani river basin is located at wet zone (IGES, 2007). Therefore, wet season in southwest monsoon (May-September) and dry season in northeast monsoon (December-February) can be seen throughout the year (Department of Meteorology, 2014). Northeast monsoon is low in rainfall for south-western part of the country which creates a dry period for Kelani river basin. In fact, nearly 21% of participants faced water scarcity problem during the dry period of the river basin (January - February) and during this period, 28% of participants used river water as alternative water source while others used nearby springs and wells.

Well water

Graham and Polizzotto (2013) revealed that in a situation where increasing uses of both pit latrines and groundwater resources are witnessed in low-income countries, there is a concern with pit latrines which may cause human health problems related with chemical and microbiological contamination of groundwater sources. To focus on this aspect, data about the distance between toilet pit and drinking groundwater source was collected. Though, majority of house holders were aware about the rules of local government authorities regarding construction of toilet pits, 76% of wells were near toilet pits and distance was less than 30m. However, there was no information recorded from respondents about health impacts related to water borne diseases.

Poor management of wastewater in household and industrial sector in Sri Lanka also poses a serious threat to the groundwater sources, especially in shallow unconfined aquifers (Villholth and Rajasooriyar, 2010) and open wells which easily attract dirty water into the wells (Shortt *et al.*, 2003). Therefore, cleaning process is important while extracting the ground water for drinking purposes. However, 45% of participants clean their dug-wells once a year and 15% of participants mentioned that it they did so once in 3 years. (Figure 10). Ninety six percent of ground water samples in the Kelani river basin were contaminated with total and faecal coliform and among them 17% of samples were contaminated with pathogenic *Salmonella* spp. along with 3% *Campylobacter* spp. (Mahagamage *et al.*, 2016b). Therefore, Department of Environment and Conservation (2016) documented that a bacteriological analysis is the most important water test to be done on drinking water and cleaning with disinfecting a dug or drilled well destroys all disease-causing microorganisms (pathogens) that may have been introduced into the well during construction, hookup and maintenance.

Scheme water

Improperly designed storage tanks, distribution system and water storing tanks at households can contaminate water by different pollutants

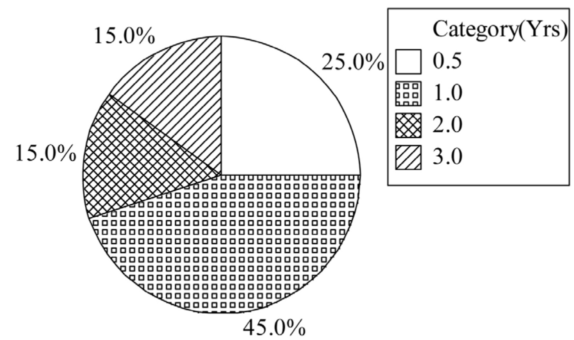

Fig. 10. Duration of cleaning dug wells belongs to the respondent in the Kelani river basin

(Chandrathilake and Silva, 2011). However, according to the participants' knowledge, 77% used scheme-water for their daily requirement; scheme-water was ranked as good for purity, color, taste and pressure of the water. Around 15% of respondents among total participants spent money for water supply scheme and they expended nearly 2% of their monthly income for water.

Monthly expenses

42% of defendants spend 50% of their monthly income for food. Sri Lankan domestic energy consumption mainly relies on firewood, kerosene, LPG and electricity. According to the International Energy Agency (IEA), the residential electricity consumption in Sri Lanka was around 39.79% in 2013. Results of the present study revealed that 55% of the peoplespent more than 2% of their monthly income for electricity. According to the Telecommunications regulatory commission of Sri Lanka 2015, mobile and internet usage has increased over the past decade and therefore, 52% of participants pay more than 2% of their income for their telecommunication facilities. Although the

Table 1. Name of the sub basinsin the Kelani river basin, along with reference number

Number	Sub basins	Number	Sub basins
1	Wak Oya/Kalatuwawa	11	PallewelaOya/MahaEla
2	Lower Middle Kelani Ganga	12	KolonnawaEla
3	AmbalanpitiOya/GonmalaOya	13	Kehelgamu Ganga
4	GetahettaOya	15	RitigahaOya
5	MahaOya/Seethawaka Ganga	16	Upper Middle Kelani Ganga
6	PusweliOya	17	PugodaOya
7	MaskeliyaOya	18	Upper Kelani Ganga
8	PanapuraOya	19	WalihelOya
9	Magal Ganga	14	GurugodaOya
10	Biyagama	20	Lower Kelani Ganga

government spend 5.96% from total expenditure in the country (Medical Statistics Unit, 2014), around 50% of participants monthly spend for medicines for different health problems. Survey revealed that most of the respondents (46%) were salaried with more than Rs.30000 per month and 42% of them take Rs.15000-30000. It was found that middle and upper middle class (Rs. 25000<) of people spend higher amount for their monthly consumption because of their higher buying capacity caused by higher level of monthly household income (Mahees *et al*., 2011). High income groups generate higher amount of solid wastes (1000g <) and it is one of the major sources of water pollution.

Water for cultivations

Around 34.4% of participants use water for their crops and among them 60% cultivates tea, 17% rubber, 13% vegetables and other 10% cultivates coffee and flower.

Background information

Population

Around 25% of population among total population are residents within the Kelani river basin (Mahagamage and Manage, 2015) and the highest population was recorded from the later part of the Kelani river basin which included most popularized districts; Colombo and Gampaha (Figure 11). Head region of the river basin consists of the rural and estate community where meandering region includes urban and rural community (Department of Census and Statistics, 2010). Head and transitional regions in the river basin are rich in tea and rubber cultivations. The inadequate toilet facilities for communities, extensive application of agrochemicals for cultivating areas, improper solid waste management and waste water discharges are the identified risk factors on water sources used by the estate community in tea plantations of the head region (Chandrathilake and Silva, 2011). Madduma Bandara *et al.* (1987) documented that lower part of the basin is polluted due to increasing shanty settlements in the canal banks due to high population densities including illegal settlements within the Colombo city. Therefore population densityis one of the major concerns for water pollution in the basin.

Industries

The Kelani river could be ranked as the largest recipient of diverse industrial effluents of the country. According to Central Environmental Authority (CEA) Kelani river basin claims around more than 9000 industries (A- Highly polluting

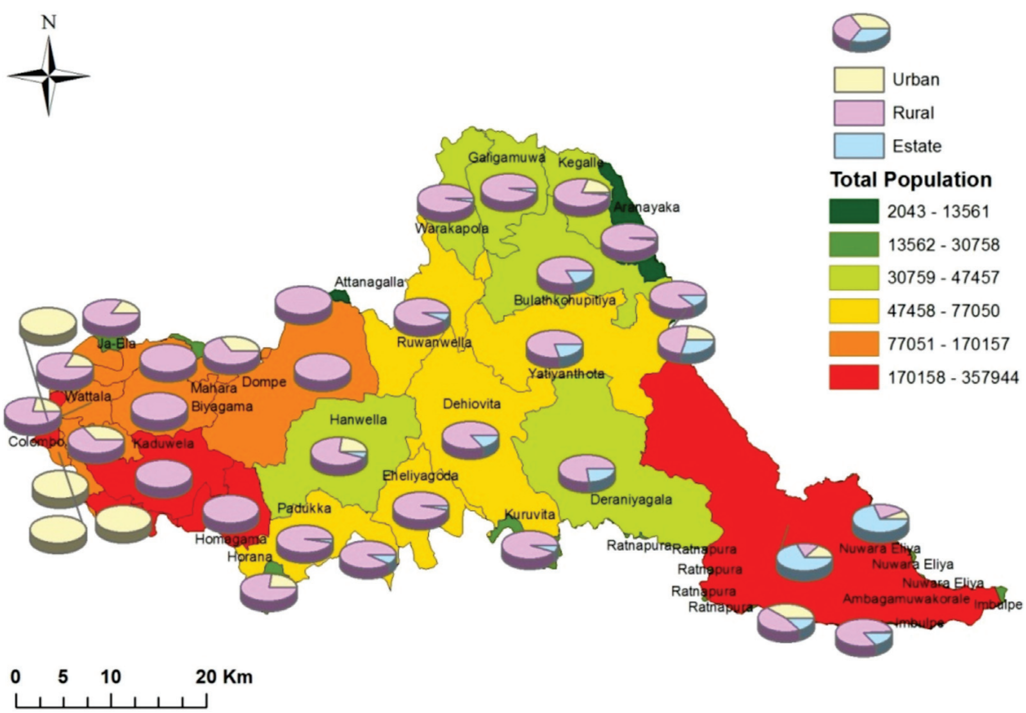

Fig. 11. Population distribution in Kelani river basin (Data: Department of Census and Statistic 2010; Map was prepared by Authors)

industries, B- Medium polluting industries, C-Low polluting industries) and among them 2600 industries belong to category A whereas 3500 industries for category B and 3000 industries for category C. Gampaha is the district where the highest number of industries are located in the river basin and they are highly diverse industries. Several types of industries which are located within the basin are given in Table 2. Mahagamage *et al.* (2014) documented that there is high COD, BOD, nitrate, phosphate, heavy metals and microbial contamination in the Kelani river basin and it was documented that major wastewater generating industries such as raw rubber factories, rubber latex factories, textile industries, food and beverage industries, steel manufacturing factories, fertilizer manufacturing factories and other industries are situated within the Biyagama export promotion zone (Danish Hydraulic Institute, 1999). Therefore, effluent from all the industries have a high

Table 2. Industries located in different districts of the Kelani river basin

Industries	Districts						
	Colombo	Kaluthara	Nuwaraeliya	Kandy	Rathnapura	Kegalle	Gampaha
Animal Husbandry	45	28	0	4	9	72	35
Asphalt Processing Plants	3	0	0	0	0	0	1
Battery Manufacturing Industry	1	0	0	0	0	0	0
Chemical Fertilizer Manufacturing	6	0	0	0	2	1	9
Coconut Oil Manufacturing	1	0	0	0	0	0	4
Coir Products	0	1	0	0	0	0	1
Concrete Pre cast Industry	32	9	0	2	18	3	10
Food processing	14	0	0	0	0	1	14
Garage	385	8	0	4	48	127	169
Garments	13	5	0	0	2	27	9
Industrial Gas (O2/N2)Manufacturers	1	0	0	0	0	0	1
Tea factories	11	0	51	9	22	21	3
Iron & Steel Mill	8	0	0	0	0	1	7
Lathe works	9	0	0	0	0	2	4
Manufacture of steel furniture	1	0	0	0	0	0	0
Metal Fabricating Industries	278	0	0	1	37	53	279
Metal quarry	217	117	14	14	34	187	181
Paint Manufacturing Industry	13	0	0	0	0	1	3
Paper Pulp Industry	11	0	0	0	0	3	15
Pet bottle Manufacturing	0	1	0	0	0	0	0
Petroleum Storage & Filling	5	0	0	0	0	0	6
Polymer Based Industries	104	0	0	2	0	1	139
Polytheen Base product	0	0	3	0	0	0	0
Powder Coating Industry	2	0	0	0	0	0	0
PVC Manufacturers	0	0	0	0	0	1	0
Rice Mill	22	25	0	0	86	13	13
Rubber Industry	12	0	0	0	0	17	0
Rubber Mill	2	0	0	0	8	23	4
Service Station	247	24	25	7	45	126	274
Textile Processing Industry	21	1	0	0	0	0	10
Tile Industry	0	0	0	0	0	30	0
Tire Tube Manufactures	11	0	0	0	0	1	7
Tobacco Industries	1	0	0	0	0	0	1
Waste Disposal, Treatment & Storage	1	0	0	0	0	0	0
Waste Water Treatment Plant	1	0	0	0	0	0	4
Water Bottling Plant	6	0	0	0	0	0	0
Other	1216	217	160	119	349	1084	1850
A	838	12	98	32	137	375	1128
B	1134	236	39	49	174	756	1097
C	728	188	116	81	349	664	828
Total	**2700**	**436**	**253**	**162**	**660**	**1795**	**3053**

(A- Highly polluting industries, B- Medium polluting industries, C-Low polluting industries)
Source: Central Environmental Authority (CEA 2014)

environmental impact on soil and water quality of both ground and surface water. According to Manage and Wijesinghe (2009) there is a heavy metal-contamination in meandering part of the kelani river basin. Further, contamination levels of some perfluoroalkyl surfactants and nonylphenol isomers in river basin were reported by Guruge *et al.* (2007).

Cultivation

Kelani river basin contributes totally 13800 ha for paddy cultivation and among this around 9500 ha are cultivated using rainwater. Upper part of the meandering region was the largest area reserved for paddy cultivation within the basin (Department of Census and Statistics, 2010). Head region paddy farmers use small irrigation systems for their cultivations (Figure 12). The head and upper part of the transitional region are covered with tea cultivation whereas rubber cultivation is rich in transitional region (Figure 13a and 13b). Coconut cultivation could be seen in both upper part of the meandering region and transitional region (Figure 13c). The river basin is rich in several other crops as well. Jack and plantain cover a larger area of the basin than other minor crops in the basin (Figure 14). As the major-crops-cultivation areas located in the catchments utilize more fertilizer, pesticides and herbicides,these agro chemicals contaminate the soil and surrounding aquatic environments (Wickremasinghe, 1980). Mahagamage *et al.* (2016c) mentioned that elevated concentrations of Cu, Cd, Pb and Zn were recorded from the head region where Cr concentration was high in the transitional region groundwater and this may be due to heavy usage of phosphate rich fertilizers and pesticides in agricultural areas in the river basin. Chlorothalonil, Profenofose, Oxyflurefen, Chlophyriphose and Diazinon like pesticides were recorded from both ground and surface water of the head and transitional regions (Mahagamage *et al*., 2016d). Therefore, proper management criteria should be introduced to manage the cultivations in the catchments where excessive fertilizer and pesticide applications occur.

Livestock production

Livestock production is vital for developing countries as it provides a large variety of goods and services by using different animal species and different sets of resources, in a wide range of agro-ecological and socio-economic conditions (Steinfeld *et al*., 2006). According to the census and statistical data, livestock production of the river basin consists

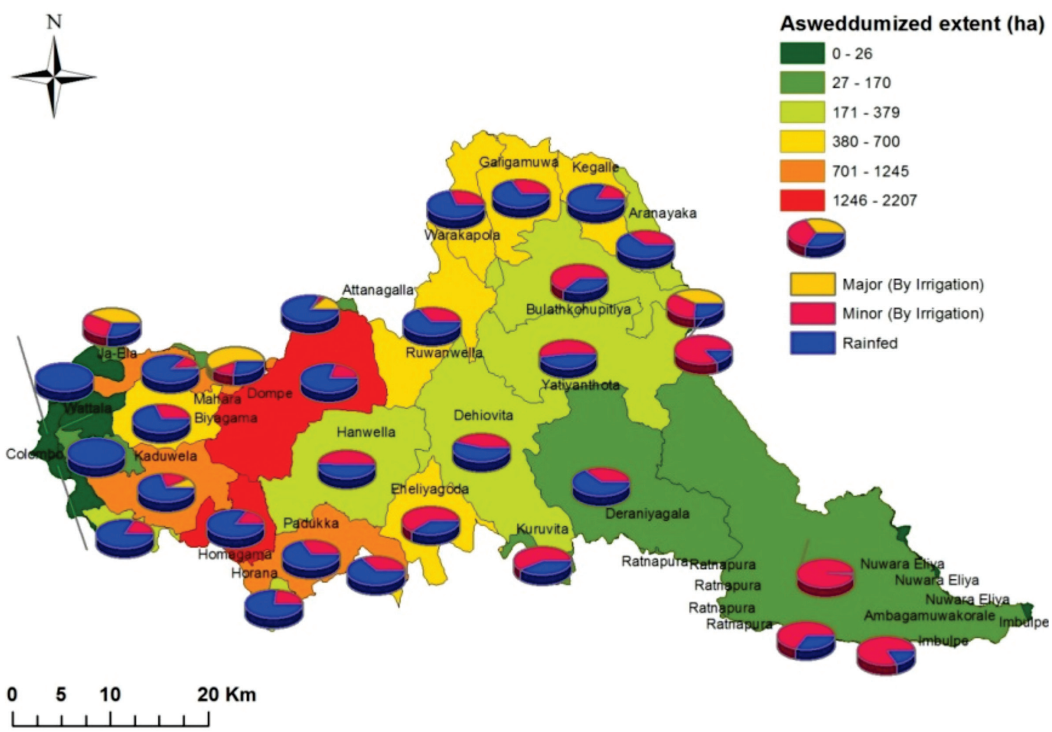

Fig. 12. Paddy cultivation in Kelani river basin (Data: Department of Census and Statistic 2010, Map was prepared by Authors)

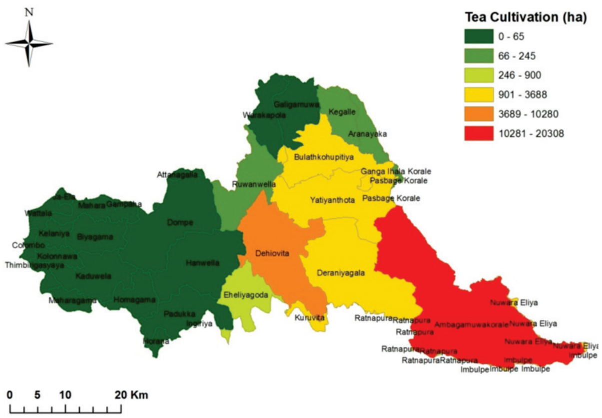

Fig. 13a. Tea cultivation in Kelani river basin (Data : Department of Census and Statistic 2010, Map was prepared by Authors)

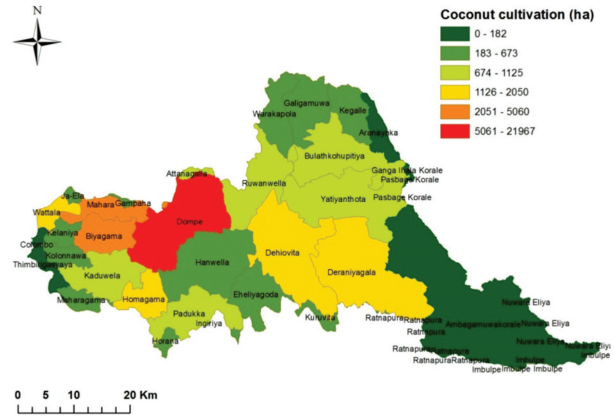

Fig. 13c. Coconut cultivation in Kelani river basin (Data : Department of Census and Statistic 2010, Map was prepared by Authors)

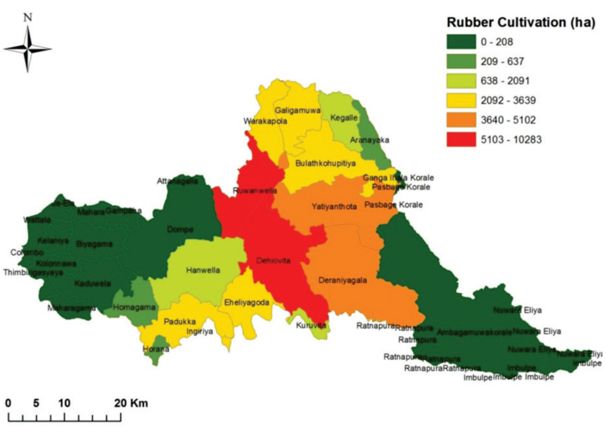

Fig. 13b. Rubber cultivation in Kelani river basin (Data : Department of Census and Statistic 2010, Map was prepared by Authors)

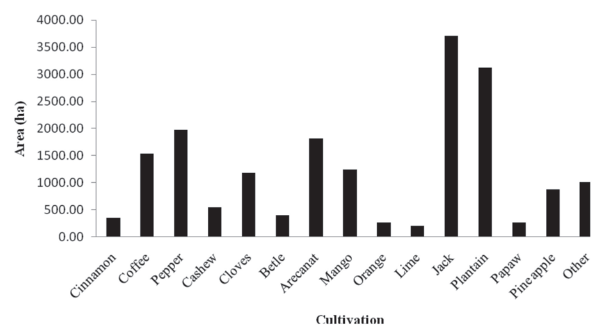

Fig. 14. Minor Crop statistics in Kelani river basin (Source: Department of Census and Statistic 2010)

of cattle milk, buffalo milk and egg. Their average productions were 47000 l/day, 12500 l/day and 25500 eggs/day respectively. The highest cattle milk production was showed from the head region where as buffalo production was high at southern part of the meandering region. Head region and meandering region claimed high production of eggs (Figure 15a, 15b and 15c). Kelani river basin contributed to fulfill protein sources in the country and Steinfeld *et al.* (2006) documented that the individual consumption of livestock products is closely related to per capita income and as income in many developing countries has grown rapidly over the past two decades, consumption levels of meat and other livestock products have also increased. Due to these circumstances, the increment of BOD and *E.coli* and total coliform bacteria level can be mainly attributed to the organic and micro biological pollution resulting from land use characteristics such as plant debris and animal waste (Athukorala *et al*., 2013). Mahagamage *et al.* (2016e) documented that *Salmonella* spp., *Shigella* spp., and *Campylobacter* spp. are the common causes of bacteria for waterborne diseases and these bacteria are rich in livestock manure which is used for agricultural purposes. Therefore, possible direct contamination of drinking water by pathogenic bacteria may due to livestock wastewater drain to the catchment of the river basin. However, Mahagamage and Manage (2014) documented that Kelani river water is good for livestock purposes after calculation of water quality index values for livestock.

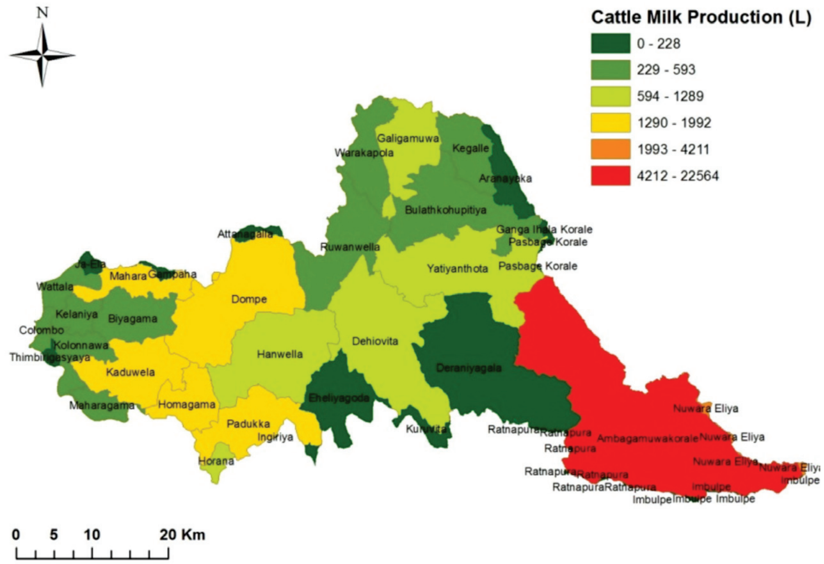

Fig. 15a. Cattle milk production in Kelani river basin (Data: Department of Census and Statistic 2010, Map was prepared by Authors)

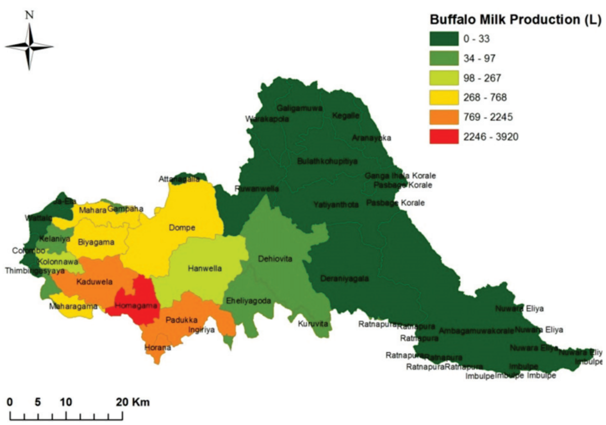

Fig. 15b. Buffalo milk in Kelani river basin (Data: Department of Census and Statistic 2010, Map was prepared by Authors)

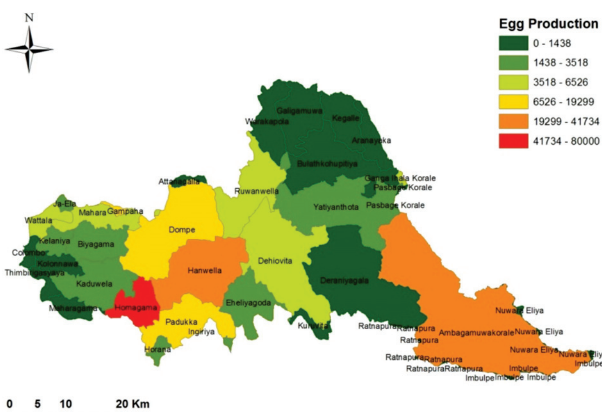

Fig. 15c. Egg production in Kelani river basin (Data: Department of Census and Statistic 2010, Map was prepared by Authors)

CONCLUSION

Majority of participants had a good literacy and most of them in the head and transitional regions of the river basin drink spring water (53.8%), 20% consume well water and the rest used national or village level water schemes. 44.3% of the participants consume boiled-water. Especially, the spring water consumers and most of the well water consumers drink water without any treatments. Regarding waste disposal methods, 70% of respondents used garbage pits to dump their domestic waste and they release their waste water directly to their own land or small tributaries within the premises of the river basin. It was found that 19% of wells were close to the toilet pits (<100 feet), though none of the respondents mentioned about the waterborne diseases in their medical history. 34% of participants used water for their crops. Head region consists of estate community and they live with low income and low sanitary facilities. Further, participants were well aware about the river basin and its pollution and most of them want to minimize contamination. Livestock production of the river basin is cattle milk, buffalo milk and egg. Kelani river basin claims to have around 9000 industries and the highest number of industries are located in Gampaha district where the second highest population is recorded in Sri Lanka. Therefore, high pollution of water and environment could be seen in lower part of the river basin. The results of the study are alarming and a proper strategic plan to protect the Kelani river basin is a must in order to prevent water borne diseases of water consumers in the river basin.

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