原著：

A Study on Regional Environmental Hygiene in View of Complaints about Public Nuisances in Rural District

Yoshiharu HORI*, Tamotsu MIYOSHI*, Masahide IMAKI*
and Takeshi YOSHIMURA*

Summary

This survey was conducted in a local city, Tokushima for its 23 administrative sections, which were classified into rural, non-rural and mixed districts based on the data related to agriculture. Complaints of public nuisances in these districts have been examined and the following findings have been obtained.

1. Complaints about water pollution and offensive odor in the rural district and those about offensive odor and noise in the mixed district have been raised more often, respectively. While, in the non-rural district more complaints about noise have been raised. Thus, it is recognized that possible pollution phenomena vary depending on regional patterns.
2. In time-serial comparison between the first half (1977-1980) and the second half (1981-1984) of survey period, it is found that total complaints of public nuisances have been reduced and the complaints in the rural district have been increased for all the types excepting dust. Therefore, it is suggested that regional environment in suburban farm villages has been deteriorating.

① regional environmental hygiene ② complaints of public nuisances ③ rural district ④ environmental pollution ⑤ offensive odor

I. INTRODUCTION

During the period of rapid economic growth, serious environmental pollution had occurred in many areas throughout Japan, causing the country to be confronted with a significant crisis of environmental disruption¹⁾. After that, however, what is called industrial pollution has begun to show a sign of subsiding due to the strong opposition coming from society requiring more and better pollution control and as a result of stagnation of economic activities resulting from the oil crisis.

On the other hand, traffic pollution²⁾, community noise³⁾ and other urban-life-related pollution still are prevalent in today's environment, constituting the mainstream of today's environmental problems. Moreover, this tendency seems to have extended to local cities, not to speak of big cities, due to

the prevalence of the urbanized life-style and under the influence of the information-oriented society. Nowadays, in local cities scattering urbanization and mixing of farming and non-farming households in peripheral areas have been progressing, and it has been reported that environmental problems are continuing unabated threatening our future environment and life-style⁴⁾.

In the previous report⁵⁾, the authors examined the relationship between social environmental factors and complaints of public nuisances as a regional environmental indices. As a result, it was recognized that complaints of public nuisances can be a useful index for the promotion of regional environmental hygiene. This time the authors have observed first hand public nuisance complaints in rural, non-rural and mixed districts in a local city and examined the difference in regional environ-

* Department of Public Health, School of Medicine, The University of Tokushima

mental hygiene among these districts. As a result, the authors have obtained a good deal of beneficial knowledge, which will be reported in the following.

II. AREA SURVEYED AND METHODS USED

1. Outline of the Area

The area surveyed is Tokushima City, where land use is as follows: urbanized area is 3,708 ha. (19.7%), urbanization-controlled area is 15,106 ha. (80.3%), the total being 18,800 ha. In the urbanized area, urbanized land use for residential houses, commerce, industry and other purposes takes up 70.2% of the total land area, while natural land use for farmland, forest land and other related uses makes up the remaining 29.8%. In the urbanization-controlled area, on the other hand, the share of urbanized land use is 12.5%, while that of natural land use amounts to 87.5%, in which land use for farmland and for forest land is 36.3% each.

2. Data

Analyses were conducted on the basis of the following data obtained from 23 administrative sections forming Tokushima City.

1) Complaints of Public Nuisances

Complaints of public nuisances of 1,278 cases were used which have been accepted by Tokushima City from its citizens over an 8 year period from 1977 to 1984 and classified into 6 types of air pollution (dust • soot and smoke), water pollution, noise, vibration and offensive odor.

2) Data of Regional Patterns

The results of the "1980 Population Census of Japan" conducted in October, 1980 were used for the population, number of households and rate of persons 15 years old and over employed in agriculture in each administrative districts, and other data related to agriculture such as the farming households population, the rate of the farming household population and number and rate of farming households were cited from the "1980 World Agriculture and Forestry Census".

III. RESULTS

1. Progress of Complaints of Public Nuisances

Figure 1 shows the progress of complaints of public nuisances. The number of complaints peaked

in 1977 at 224 and thereafter showed a tendency to decrease in general although there were some fluctuations up and down, until now. Classified by type of complaint, noise was at the top of the list with a level as high as 30-40% of the total. Complaints of air pollution (dust • soot and smoke) and of offensive odor follow those of noise, their rankings showing some change in position each year. On the other hand, the ratio of complaints directed against water pollution and of vibration as

Fig. 1 The progress of complaints of public nuisances.

Fig. 2 The classification of districts and administrative sections included into them respectively

Table 1 The classification of districts by using the data related to agriculture.

Administrative section	Area (square kilometers)	Population	Households	Farming population	Rate of farming population (%)	Farming households	Rate of farming households (%)	Rate of engaged in agriculture *	
Rural district	O J	9.06	6,676	1,791	2,462	36.9	536	29.9	16.8
	F D	7.33	3,687	1,069	1,297	35.2	280	26.2	30.1
	K I	5.76	3,495	835	2,095	59.9	455	54.5	44.1
	M I	4.93	4,888	1,231	2,126	43.5	443	36.0	26.4
	N Y	10.85	2,660	487	1,552	58.3	323	66.3	31.2
	K H	20.03	6,915	1,691	2,882	41.7	618	36.5	20.2
	T K	38.80	5,800	1,371	3,598	62.0	767	55.9	43.9
	Total	96.76	34,121	8,475	16,012	46.9	3,422	40.4	30.4
Mixed district	K W	19.21	12,468	3,850	2,678	21.5	565	14.7	13.9
	K M	5.63	17,009	5,555					2.67
	K N	10.56	22,486	7,488					3.76
	K O	8.58	11,256	3,068	2,460	21.9	515	16.8	13.0
	H A	11.53	23,660	7,765					3.98
	K R	15.36	10,745	3,042	2,490	23.2	541	17.8	14.8
	O K	4.26	12,391	3,887					3.31
	Total	75.13	110,015	34,655					7.92
Non-rural district	U C	1.53	7,640	2,598					0.08
	S I	0.88	3,506	1,061					0
	N I	0.61	3,596	1,390					0.27
	H I	0.74	9,499	3,499					0.15
	S A	1.80	15,675	5,533					0.49
	S W	1.84	12,193	4,638					0.09
	I H	2.60	18,915	7,173					0.78
	I T	2.92	17,289	6,047					0.57
	T U	3.34	16,894	5,042					0.38
	Total	16.26	105,207	36,981					0.31
All city	188.15	249,343	80,111	29,371	11.8	6,270	7.8	7.22	

* Employed persons 15 years old and over

regards the total shows a decreasing tendency.

2. Classification of Districts in View of Agriculture

By using the data related to agriculture classification districts is made and shown in Table 1. Seven administrative sections, which have each 30% or more in the rate of the farming household population, 20% or more in the farming household rate and 15% or more in the rate of persons of 15 years old and over employed in agriculture, are classified into "rural district". Nine sections, where the rate of persons of 15 years and over employed in agriculture is 1% or less each, are classified into "non-rural

district" and other 7 sections into "mixed district". The classification of districts and administrative sections included into them respectively are shown in Fig. 2.

3. Complaints of Public Nuisances by the Districts

Table 2 shows the accumulated number of complaints about public nuisance in each district for the 8 year period from 1977 to 1984. The total complaints number 630 in the mixed district, 553 in the non-rural district and 166 in the rural district in that order. According to type of complaints, complaints of noise in the non-rural and the mixed districts are dominant, followed by complaints of

Table 2. The accumulated number of complaints about public nuisances in each district for the 8 year period from 1977 to 1984.

Administrative section		All complaints	Dust	Soot and smoke	Water pollution	Noise	Vibration	Offensive odor	others
Rural district	O J	57	5	8	9	18	3	9	5
	F D	49	2	8	6	8	1	18	6
	K I	12	0	0	3	3	0	2	4
	M I	20	1	0	5	5	0	4	5
	N Y	6	0	0	2	1	0	1	2
	K H	6	0	0	1	2	0	2	1
	T K	16	3	0	5	2	0	6	0
Total		166	11	16	31	39	4	42	23
Mixed district	K W	83	6	15	8	25	2	24	3
	K M	138	12	20	12	43	10	34	7
	K N	109	6	17	11	37	8	25	5
	K O	73	5	3	20	25	3	12	5
	H A	77	0	15	12	27	3	18	2
	K R	44	1	3	11	19	1	7	2
	O K	106	16	19	3	36	6	23	3
Total		630	46	92	77	212	33	143	27
Non-rural district	U C	58	2	8	1	32	4	7	4
	S I	26	0	6	1	12	3	4	0
	N I	13	1	1	0	6	2	2	1
	H I	46	2	4	1	23	6	9	1
	S A	54	5	7	0	25	5	8	4
	S W	79	9	11	1	39	3	16	0
	I H	61	5	7	7	26	5	9	2
	I T	139	31	27	6	57	3	12	3
	T U	77	8	14	3	22	5	19	6
Total		553	63	85	20	242	36	86	21
All city		1349	120	193	128	493	73	271	71

offensive odor in the mixed district. Table 3 shows the accumulated number of complaints per 10 thousand inhabitants. The non-rural district has the greatest number of complaints regarding dust, noise and vibration, followed by the mixed and the rural district in that order. The number of these complaints coming from the non-rural district amounts to approximately twice as many as those in the rural district. The mixed district has the greatest number of complaints of soot and smoke and offensive odor, the non-rural and the rural districts follows it in that order regarding complaints of soot and smoke, and the rural and the non-rural districts follows in that order for complaints of offensive odor. On the other hand, complaints of water pollu-

Table 3. The accumulated number of complaints per 10 thousand inhabitants in each district.

complaint	Rural district	Mixed district	Non-rural district	All city
Dust	3.2	4.2	6.0	4.8
Soot and smoke	4.7	8.4	8.1	7.7
Water pollution	9.1	7.0	1.9	5.1
Noise	11.4	19.3	23.0	19.8
Vibration	1.2	3.0	3.4	2.9
Offensive odor	12.3	13.0	8.2	10.9
All complaints	48.7	57.3	52.6	54.1

Fig. 3 The accumulated number of complaints of public nuisances per 10 thousand inhabitants by districts.

tion come mostly from the rural district, followed by the mixed and the non-rural districts in that order, and the number of complaints coming from the rural district is about 5 times as many as that in the non-rural district.

Figure 3 shows the accumulated number of complaints per 10 thousand inhabitants by districts. In the rural district complaints of offensive odor are the highest in number, followed by the number of complaints of noise, water pollution, soot and smoke, dust and vibration in that order. The mixed district has the most complaints regarding noise, followed by those of offensive odor, soot and smoke, water pollution, dust and vibration in that order. In the non-rural district also complaints of noise has the greatest number, followed by the number of complaints of offensive odor, soot and smoke, dust, vibration and water pollution in that order.

4. Progress of the Accumulated Numbers of Complaints about Public Nuisances by the Districts

Figure 4 shows the progress of the accumulated number of complaints about public nuisances from the first half to the second half of the survey period in each district. Generally speaking, the number of complaints have been reduced in the mixed and non-rural district, while they have tended to

increase in the rural district. Especially, complaints of offensive odor and noise have increased in the rural district, while complaints about vibration, water pollution and soot and smoke in the mixed district and those about vibration, soot and smoke and dust in the non-rural district have been on the decrease. Figure 5 shows the progress of the occurrence rate of complaints about public nuisances by the events in each district. The share of the rural district tends to increase for the all districts except dust.

IV. DISCUSSION

Itai-itai disease, Minamata disease and other serious pollution-related diseases occurred in the past in Japan⁶). Itai-itai disease and Minamata disease are both industrial pollution generated on the basis of the farm-village-type community and the fishing-village-type community, respectively. It is known that either of these diseases is deeply related to the primary industry, and many studies on them have been made in preventive medicine and treatment⁷⁻⁹). Many reports on the pollution by agricultural chemicals have also been made as one of the environmental problems in the rural district¹⁰⁻¹²). However, few complaints of this pol-

Fig. 4 The progress of the accumulated number of complaints about public nuisances from the first half to the second half of the survey period in each district.

lution as an appearance of regional environmental problems have been reported, and especially almost none for the rural district^{13,14}.

The authors examined last time the relationship between complaints of public nuisances and socio-environmental factors such as urban infrastructure and recognized that the former can be socio-hygienically a useful index of regional environmental hygiene. Therefore, it is considered to be important for environmental hygiene in rural district to examine complaints about public nuisances there^{15,16}. This time, the authors have examined, from a practical viewpoint, environmental hygiene in farm villages by observing the actual conditions of complaints about public nuisances and regional environment. In this survey, three districts which show different regional patterns have been examined and the progress from the first half to the second half of the survey period has been investigated.

Fig. 5 The progress of the occurrence rate of complaints about public nuisances by the events in each district.

ed. The non-rural district in this survey does not directly mean an urban area, but an area mixing residential and industrial districts and including fishing villages.

At first, when complaints of public nuisances are examined by the events, those of dust, noise and vibration are found most often in the non-rural district, next in the mixed district and in the rural district in order. This would be because that the non-rural district has within it a section concentrating factories related to the woodworking industry which is a local industry in Tokushima City. Many of the complaints of noise and vibration are considered to be raised in relation to civil engineering and constructing works in the urban district. However, the difference between the non-rural and the mixed districts is not so remarkable, which seems to show the progress of diffusion of factories into the mixed district. Complaints of soot and smoke are seen more often in the mixed and non-rural districts than in the rural district. This would be because complaints about incinerators of factories in the mixed district and complaints about boilers of business under-takings in the urban district are raised vary

frequently. On the other hand, complaints of offensive odor are seen more often in the mixed and rural districts than in the non-rural district. This seems due to the fact that complaints related to the livestock industry and farming work are raised very frequently in the mixed and rural districts. Moreover, this would be because that the rural district has within it a section where dead animal processing plants for processing animal bones are located and many complaints of offensive odor are raised in this section and neighbouring mixed district. Complaints about water pollution are seen very often in the rural and mixed districts, and the complaints in the rural district are about 5 times as many as those in the non-rural district. This seems due to the fact that complaints about the pollution of agricultural irrigation canals for water supply purpose with livestock effluent in the rural district and complaints about failure of septic tanks in the mixed district where public sewerage is not provided are raised quite often. Generally speaking, complaints in the mixed district have tended to increase. It can be considered that this tendency is partly due to the mixed habitation of traditional farming households and non-farming households having immigrated from other districts.

As previously discussed, since the rural district has many complaints of offensive odor and water pollution, it is necessary for this district to make up for the delay in antipollution measures of livestock-related industries in view of environmental hygiene. As complaints about offensive odor, soot and smoke, water pollution and noise are raised very often in the mixed district, it seems that the mixing with farm village due to the progress of disordered urbanization and diffusion of industries is the problem for this district. In order to solve this problem completely, proper urban planning and industrial development are considered to be necessary as has been pointed out since the past¹⁷⁾. Finally, complaints of noise, vibration and dust have been increasing in the non-rural district. This fact corresponds well to the report¹⁸⁾ of the Environmental Disputes Coordination Commission suggesting that the share of complaints about noise, air pollution and vibration in an area becomes higher as popula-

tion there increases and this sort of pollution can be considered to be urban-type pollution. From this report, we may infer that the characteristics of urban-type pollution have appeared also in the non-rural district investigated in this survey. These findings, however, are only of a local city, and therefore, investigations in other cities would be necessary in the future.

Next, the results of the time-serial examination conducted for a many-sided observation of actual conditions in these districts are summarised as follows. In view of the variation of complaints about public nuisances from year to year, total complaints have tended to decrease since 1977, having been reduced for the total city area from 720 in the first half of the survey period (1977-1980) to 558 in the second half (1981-1984), which means a decrease of 22.5%. According to the various districts, the mixed district and the non-rural district showed decreases of 30.6 and 26.7%, respectively; while the rural district showed an increase of 50.9%. In accordance to the type of the complaints, complaints about vibration, water pollution, soot and smoke and noise have decreased in the mixed district, while those about vibration, soot and smoke, dust and noise have been reduced in the non-rural district. As for vibration, this tendency seems to be caused by fact that the regulation of vibration has been started by the Vibration Regulation Law in 1978 and vibration-proof techniques in construction work have been developed. On the other hand, for complaints about air pollution and noise efforts by manufacturing under takings for pollution control seem to have brought about a reduction in complaints. We can infer that the reduction of complaints about water pollution in the mixed district has been caused by the expansion of public sewerage and improvements of sewage channels for roads. However, on the contrary to the above-mentioned districts, complaints of all events excluding dust have been increasing in the rural district. Especially, complaints about offensive odor, noise and vibration that are called psycho-sensory public nuisances have been on the increase. Complaints regarding soot and smoke and water pollution have also been raised more often than in other districts. From these

facts, we can infer that regional environment in the suburban rural area investigated this time has been deteriorating on the whole. Moreover, it seems that consciousness of environment of the inhabitants in the rural district have been changed due to the increase in the psycho-sensory public nuisances. This may be caused by the fact that consciousness of environment increasingly varies between farming households specialized in agriculture and part-time farmers which have been changing to non-farming households¹⁹⁾. This may also be caused by sprawling development activities of big collective housing areas which bring about massive immigration of non-farming households into a rural district. Therefore, it may be necessary in the future to carry out studies on consciousness of environment in rural district by means of a social survey.

(The summary of this paper was made public in the 45th General Meeting of Japanese Society of Public Health.)

REFERENCES

- 1) Syouji, H. and Miyamoto, K.: Nippon no Kogai, Iwanami-Syoten, Tokyo, Sept. 1975, 31—66.
- 2) Kaneyasu, K. and Kanaizumi, A.: Kotsu-Kogai, Gizyutsu-Syoin, Tokyo, 1980.
- 3) Aoki, T.: The Present Condition on Printing Co, Tokyo, 1973.
- 4) Planning and Coordination Bureau, Environment Agency: Annual Report of Situation on Environmental Pollution in 1984 (Summary), Kankyo, 10 (4), 1985.
- 5) Hori, Y., Miyoshi, T. and Imaki, M.: Evaluation of Complaints about Public Nuisances as Regional Environmental Indices, Jpn. J. Hyg. 41(5), 1986.
- 6) Saito, K.: Kenko to Kankyo, Asakura-Syoten, Tokyo, 1984, 61—108.
- 7) Fukushima, M.: Environmental pollution by cadmium and its health effects; An epidemiological approach to the "Itai-itai" disease, In "New Methods in Environmental Chemistry and Toxicology" (Editor: F. Coulston, F. Korte and M. Goto), 231—252, International Academic Printing Co, Tokyo, 1973.
- 8) Kobayashi, E.: AN EPIDEMIOLOGICAL STUDY ON THE HEALTH EFFECTS OF ENVIRONMENTAL CADMIUM, Jpn. J. Public. Health., 29, 123—133, 1982.
- 9) WHO Task Group: Environmental Health Criteria 1. Mercury, WHO, 1976.
- 10) Wakatsuki, T.: Kankyo-Osen to Kenko-Syogai, Kodansha, Tokyo, 1975.
- 11) M. B. Abou-Donia et al.: Neurotoxic Effect of Leptophos, Experientia, 30(1), 63—64, 1974.
- 12) Shibutani, M. et al.: Kankyo-Osen to Nogyo, Hakuyusya, Tokyo, 1984.
- 13) Soda, T., Wakatsuki, T. and Yanagisawa, F.: RURAL HEALTH IN JAPAN, IGAKU SHOIN Ltd., Tokyo, 1969, 89—90.
- 14) District Administrative Inspection Bureau, Management and Coordination Agency: Result of Local Inspection Concerning Environmental Protection of Livestock Husbandry (Abstract), Industrial Pollution Control, 22 (8), 45—52, 1985.
- 15) Wakatsuki, T.: Noson Igaku, Keisosyobo, Tokyo, 1983, 32—52.
- 16) Abe, S. and Takakuwa, E.: The Textbook of Hygiene and Public Health, NANZANDO COMPANY, LIMITED, Tokyo, 1974, 367—405.
- 17) Sumita, S.: Toshi-Keikaku to Kankyo-Seisaku, JURIST ZOKAN SOGOTOKUSYUU(13), 257—261, July 1979.
- 18) Environmental Disputes Coordination Commission: The Trend of Environmental Problems from Pollution Complaints, Journal of Environmental Pollution Control, 21 (1), 93—98, 1985.
- 19) Fukutake, T.: Nippon no Noson (2nd Ed.), Tokyo Daigaku Syuppankai, Tokyo, 1985.

公害苦情からみた農村における地域環境衛生について

堀 義治*, 三好 保*, 今木雅英*, 吉村 武*

地方都市である徳島市域23行政区を対象とし、農家人口、農家戸数などの農業関連指標により農村地域、非農村地域および混在地域に分類した。そして、地域環境指標としての公害苦情からみた、これら地域における環境衛生状態の差異について実証的に検討した結果、次のような知見を得たので報告する。

1. 農村地域では水質、悪臭苦情が多く、混在地域では悪臭、騒音苦情が多い。また、非農村地域では騒音苦情が多いことが認められた。これらは、それぞれの地域における環境衛生要因との関連性がみられ、このことから、発生しやすい公害事象が地域形態により異なることが認められた。

2. 各地域における公害苦情発生について、調査前期（1977～1980年）と調査後期（1981～1984年）の経時的变化を検討したところ、農村以外の地域は総体的に減少の傾向にある。しかし、農村地域においては、粉塵を除くすべての公害事象が増加していることが認められた。このことから、農村地域における環境衛生状態は悪化していることが示唆された。

①地域環境衛生 ②公害苦情 ③農村地域 ④公害 ⑤悪臭

* 徳島大学医学部公衆衛生学教室