Journal for Geometry and Graphics
Volume 7 (2003), No. 1, 75–87.

Characteristics of the Villagers' Drawings on the Village Development in Lao P.D.R.

Junko Komoto[1], Katsuyuki Yoshida[2], Satoshi Chikami[3]

[1]*Department of Architectural Engineering, Graduate School of Engineering, Osaka University, Suita, Osaka 565-0871 / Japan*
email: byu02052@yahoo.co.jp

[2]*Cybermedia Center, Osaka University*
Suita, Osaka 565-0871 / Japan
email: yoshida@arch.eng.osaka-u.ac.jp

[3]*Faculty of Social and Information Sciences, Nihon Fukushi University*
Handa, Aichi 475-0012 / Japan
email: chikami@n-fukushi.ac.jp

Abstract. Considering the possibility of communicative competence through pictorial media in implementing actions for rural development, we can start with looking at the pictures drawn by the villagers in Lao P.D.R. and comparing the pictures of the present status with those showing the "future village", then examine the graphic characteristics of their pictures, the spatial recognition of the villagers, and the meanings which the pictures indicate. As the result of analyzing 240 pictures drawn by villagers, the drawings, which are not influenced by descriptive geometry, include representations quite different from that descriptive geometry, e.g., unrealistic views showing three different sides of a house simultaneously. As for the contents of the drawings, though the villagers rarely see any kind of maps, the scaling is well-done in the images of the present village, and the future images have a tendency to pick up some particular motifs.

Key words: Space Recognition, Image Drawing

MSC 2000: 51N05

1. Introduction

Lao People's Democratic Republic (hereafter "Laos") is a landlocked country which shares borders with Thailand, Cambodia, Vietnam, China and Myanmar. Two main physical features, rivers and mountains, dominate the topography of Laos [5]. Apart from that, despite respectable growth in the economy since the introduction of the New Economic Mechanism,

ISSN 1433-8157/$ 2.50

poverty is still prevalent in Laos [4]. Under such circumstances, Laos' government identifies its priority programs such as food production, commercial production, shifting cultivation stabilization, rural development, infrastructure development, external economic relations, human resource development and service development, and it intends to quit the ranks of Least Developed Countries by 2020. "The approaches rarely took the grassroots as the starting point from which to define needs and potentialities, and involve the local population" is one of the reason that the past approaches to local rural development have not been very successful. Therefore the government is questing for the sustainability of its rural development programs which asks for more participation and real "ownership" at the local level [3].

The method of analyzing pictures drawn by examinees is well-known in the field of clinical psychology and developmental psychology. As it is practiced in terms of analysis on psychological conditions or in terms of examination of the development of children's drawing, the graphic characteristics of the figures contained in examinees' pictures have not been primarily investigated. Considering the further possibility of communicative competence through pictorial media in implementing actions for rural development, we can start with looking at the pictures drawn by the villagers in Laos. We compare the images of the "present village" with those of the "future village" and we examine the graphic characteristics of their pictures, the spatial recognition of the villagers, and the meanings indicated in the pictures.

Incidentally, this study continues a previous research published December 2000 in [2]. Its conclusions were: the pictures by villagers, who are not prepossessed with knowledge or theories of descriptive geometry, show representations different from those of descriptive geometry, e.g., 3-facets representation or 2-directions pictures. This paper presents further details on this subject including the latest development since then.

2. Method

This study consists of the field survey in the target area and the data analysis on the basis of the information and characteristics that are encompassed in villagers' drawings. Fig. 1 shows the detailed process of the field survey in Laos, which was carried out in March 2002.

In the field survey, we requested villagers to draw their images of the present village and of a future village, through each village committee. Although we showed some villagers' drawings to the members of the committees as a sample, we did not define any laws of drawing and contents.

2.1. Target Area

The data collection was carried out in seven villages in the Vangvieng District and Hinheup District, Vientiane Province, which are along the national road no. 13 and 130 – 200 km north from Vientiane Municipality, the capital of Laos, in succession to the previous survey. As the photographs of one target village show in Figs. 2 and 3, most of the land of these districts is mountainous. People's livelihood depends heavily on natural resource, as well as in the other in-country regions. Seven villages have been suffering from environmental degradation mainly caused by slush and burn cultivation. Therefore various trials are implemented to develop and manage the natural resource in sustainable ways, according to the governmental policy as mentioned above. An outline of these seven villages is shown in Table 1.

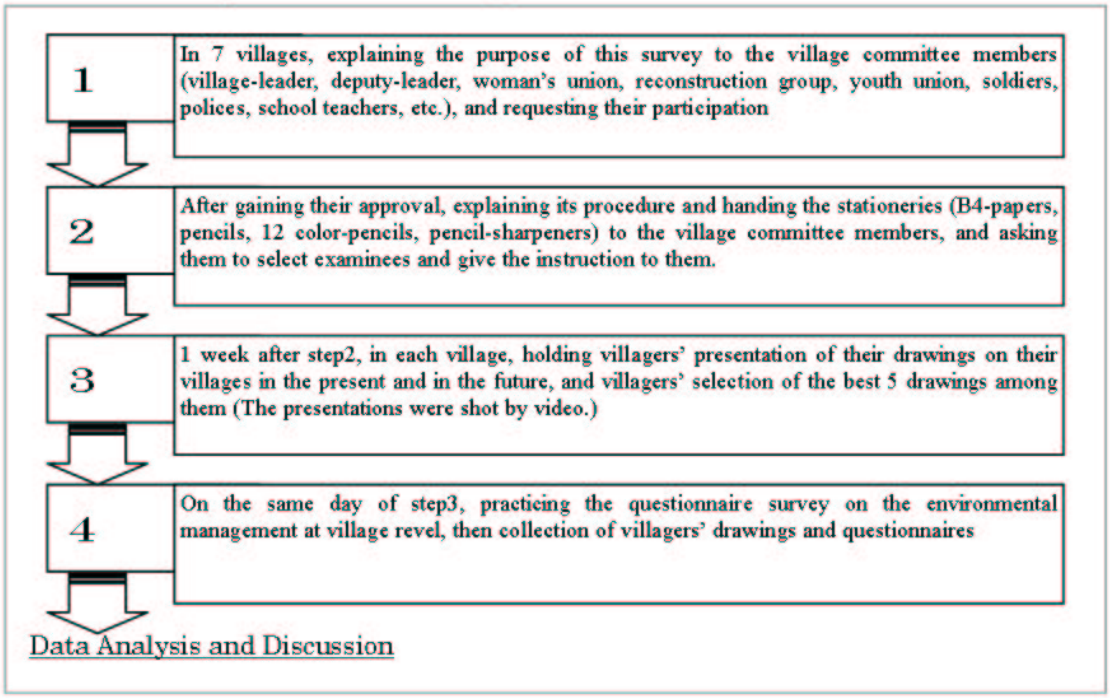


Figure 1: Steps of field survey

Figure 2: View in the target area

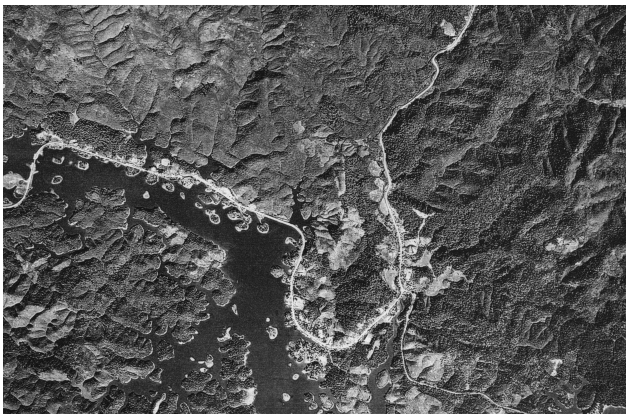


Figure 3: Aerial photo in the target area

2.2. Examinees

In each village, examinees were selected by the members of the village committee, who received the instruction about this survey, with due considerations to have no distinction about sex, ethnic category ("Lao Loum", "Lao Kang (or Lao Theung)", "Lao Soung"), job, drawing skill, age and academic background. After that, the committee members handed over the drawing equipment (B4-papers, color pencil (12 colors), pencil, eraser, pen-sharpener) to the examinees and requested them to draw images of the village in the present status and of a future village within one week.

Table 1: Outlines of target villages (Year 2000)

No.	*1*	*2*	*3*	*4*	*5*	*6*	*7*
village code	*SV*	*NT*	*HP*	*SN*	*NP*	*VK*	*HD*
established since	1981	1977	1966	1968	1983	1850	n.a.
no. of households	93	45	199	189	49	166	n.a.
population	811	284	1162	1034	399	921	n.a.
population by ethnic category							
(Lao Soung)	100%	0%	0%	56%	0%	0%	(0%)
(Lao Kang)	0%	73%	17%	1%	100%	8%	(100%)
(Lao Loum)	0%	27%	83%	43%	0%	92%	(0%)
main activity[1]	L,H,AP	AP	H,S	L,AP	AP	n.a.	n.a.
rice production	paddy-field	slush & burn	paddy-field	slush & burn	slush & burn	paddy-field	n.a.
cash income[1]	Ap,L,Em	F,L,Fo	F,W,Wa,L	H,L,Wa,S	Wa,Fo,L	Ap,T,Wa	n.a.
religion[2]	S	B,S	B	B,C,S	B,C,S	B	(B,S)
area of each type of land (unit: ha)							
(1) forest area	–	–	–	960	–	–	–
(2) agric. area	86	18	384	1,754	–	1,618	–
(3) res. area	5	5	12	13	–	14	–
(4) the others	–	–	–	–	–	–	–
(5) water	–	95	284	248	–	–	–
total	–	118	680	2,975	–	1,632	–

1: L = livestock, Fo = non-timber forest product, F = fishery, Em = embroider, H = handicraft, R = rice, M = money from overseas, W = weavin, AP = agriculture products, T = trading, S = salary (employee), Wa = wage (labor)

2: B = Buddhism, C = Christianity, S = Spirit

2.3. Data Collection

During the field survey 241 drawings (by 121 villagers) were collected. Some of the attributes of the examinees are shown in Table 2 and Fig. 4. It indicates that the average of their age is 34.6 years, and most of the examinees graduated at least from a primary school. Meanwhile we collected villagers' drawings, a video of their presentation, and questionnaires on the village natural resource management during this field survey. We analyze only the drawings of villagers in this paper.

Table 2: Data of Examinees

No.	*Village*	*No. of Drawings (present)*	*No. of Drawings (future)*	*Number of Examinees*	*Age (average)*
1	*SV*	16	15	16 (Female 1)	19 – 53 (32.6)
2	*NT*	19	19	19 (Female 2)	15 – 52 (32.1)
3	*HP*	16	16	16 (Female 0)	30 – 58 (41.4)
4	*SN*	17	17	17 (Female 7)	10 – 64 (23.9)
5	*NP*	20	20	20 (Female 2)	20 – 47 (36.6)
6	*VK*	17	17	17 (Female 5)	23 – 54 (40.7)
7	*HD*	16	16	16 (Female 1)	20 – 47 (35.8)
Total		121	120	121 (Female 18)	10 – 64 (34.6)

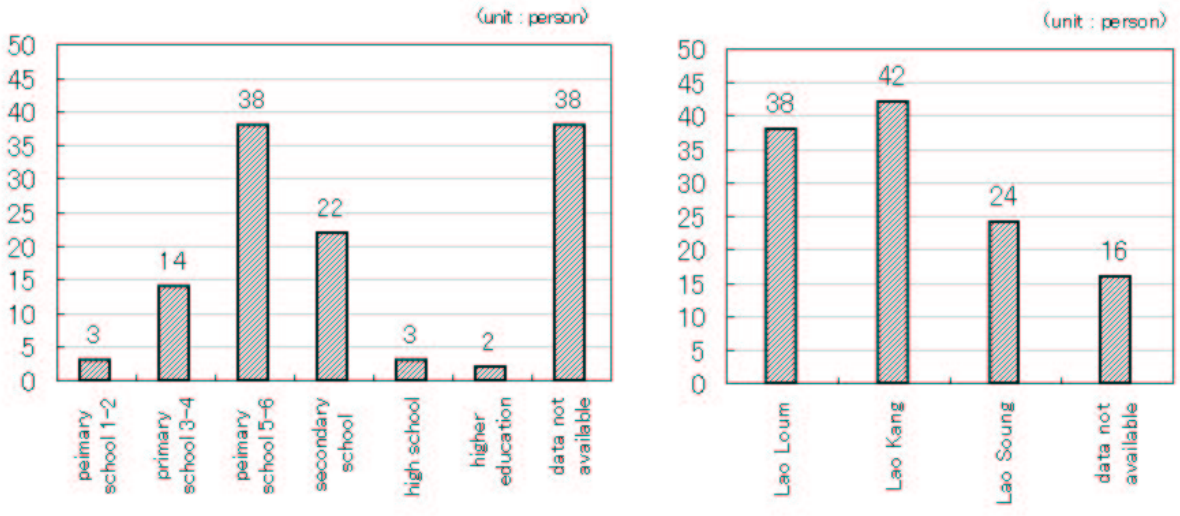


Figure 4: Number of examinees according to their academic background and ethnic group

3. Discussion on the visualized image of the present and the future village drawings

Samples of examinees' drawings are shown in Fig. 5. For the coming analysis, we removed one drawing of the present village in SV village because its counterpart of the "future village" was missing. Hence the total amount of samples became 240.

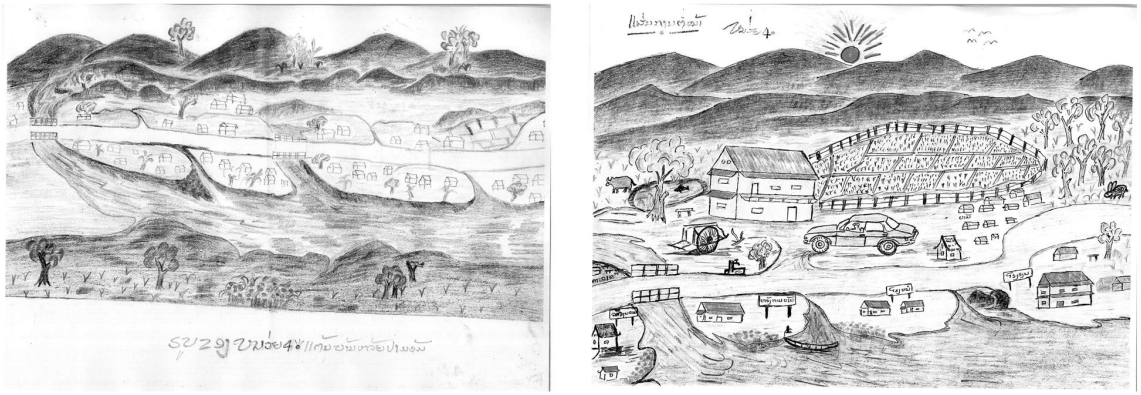
To deal with drawings in numerical values, we prepared a data sheet containing the serial number of the drawings, the village name, the examinees data (name, age, sex, position in the village, job, academic background), then a reliably check upon "networking of roads", "top view of mountain/objects", "zoning village area", "symbol", "direction of drawing", "legend", "notation" and so on.

3.1. Geometrical Characteristics

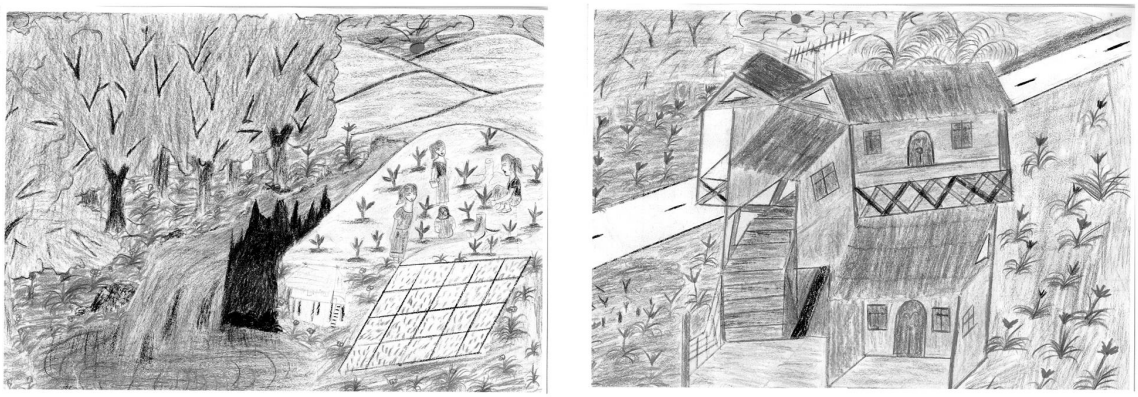
As for the figures of houses, they are sometimes delineated unrealistically with 3 sides in 2 perspectives at once (hereafter *"3-facets figure"*) (e.g. Fig. 6), as it was mentioned in the previous paper [2], which concluded that this is one of the characteristics of the villagers' drawings. So, in this paper, we focus our attention on 3-facets figures in more detail.

34 out of 120 examinees (28.3%) drew houses as 3-facets figures, and with respect to the number of drawings, 47 (27 for the present and 20 for the future image) of 240 drawings include a 3-facets figure. As the average of their ages is 33.5 years old, it implies that drawing 3-facets figures of an object does not necessarily mean the style specific to children, though these pictures have been discussed in the field of "developmental psychology" [1] (Fig. 6), which explains that it is caused by young children's habit of drawing a certain object using the neighboring line as a reference frame.

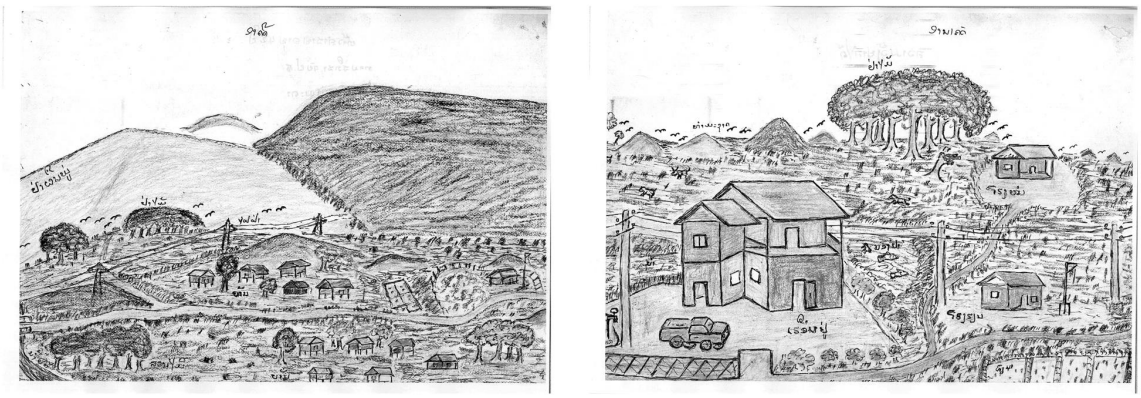
590 3-facets figures in 47 drawings are classified into eight patterns (Fig. 7, Table 3). The rate of 3-facets (per total amount of house figures) drawn in one drawing is in wide-range from 3% to 100% (average 50.6%), and sometimes one uses 2 – 3 patterns at once. So it may be said that those who draw 3-facets figure choose the multiple rules of drawings consciously



(i) the present (left) and the future (right) village drawn by one villager of the HP village (male, age = 42, ethnic = Lao Loum, educational status = primary school)



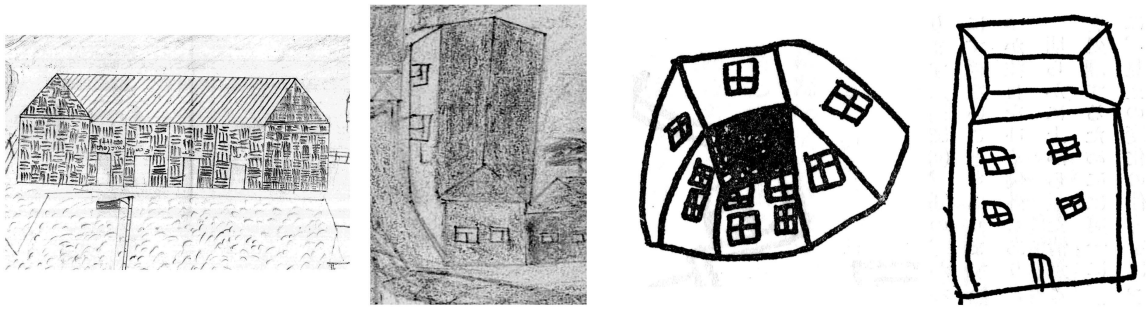
(ii) the present (left) and the future (right) village drawn by one villager of the SN village (female, age = 13, ethnic = Lao Soung, job = 4th year student in primary school)



(iii) the present (left) and the future (right) village drawn by one villager of the NP village (male, age = 42, ethnic = Lao Kang, educational status = primary school)

Figure 5: Samples of examinees' drawings

or unconsciously. The most popular pattern is A used by 29 examinees, and as B – F can be dealt as sub-patterns of A, 97.8% are quite similar. G and H are the striking examples, and



(a) villagers' drawings (b) children's drawings

Figure 6: Multi-facets figure of a house (Fig. (a) is quoted from [1])

Table 3: Patterns of 3-facets houses

pattern	*features*	*no. of drawn houses*	*no. of examinees*
A	Symmetrical pattern Orthogonal projection-like with a straight eaves-line and a straight ground-line	558 (94.6%)	29
B	Symmetrical pattern Both sides presented as oblique projection-like	3 (0.5%)	2
C	Symmetrical pattern Both sides presented as perspective projection-like	11 (1.9%)	2
D	Asymmetrical pattern One side presented as inverse perspective projection-like and the other side as orthogonal projection-like	1 (0.2%)	1
E	Asymmetrical pattern One side presented as perspective projection-like and the other side as orthogonal projection-like	3 (0.5%)	3
F	Asymmetrical pattern Both sides presented as perspective projection-like	1 (0.2%)	1
G	Asymmetrical pattern Axonometric projection-like Back side lifted up to be seen	2 (0.3%)	1
H	Asymmetrical pattern Balcony presented as oblique projection-like	11 (1.9%)	1
	Total number	590	

both of them were used only by one examinee.

To analyze if emerging 3-facets figures in drawings can be explained by the other factors or not, a quantification method is applied to the data. According to the result of the HAYASHI's *discrimination function analysis* of 2nd type using Excel "SURYOKA-RIRON vers. 1.0", which is regarding a 3-facets figure as criterion variable and the other items as the explanatory variables, each villager is given a value, the so-called *"sample score"* as:

$$y = \sum_{i=1}^{m} \sum_{j=1}^{n(i)} a_{ij} x_{ij},$$

where

y : outcome score for each examinee
m : total number of items = 26
i : item number
$n(i)$: total number of categories of each item
j : category number
a_{ij} : category score, given to the j^{th} category of i^{th} item for subdividing the examinees into two groups
x_{ij} : dummy variables, which indicates the existence of the applicable category = 1 or 0

It follows from this analysis that the drawings can be clearly subdivided into two groups by sample scores (Fig. 8) with probability 81.7%, and the items that mainly act on this discrimination are those about directions of objects (such as the direction of an electricity-pole, of mountains, etc.) since their ranges of categories are comparatively big (Table 4). Besides, when some categories containing only one or two samples but having significant impact on the result are removed, the outcome appears similar to the original one.

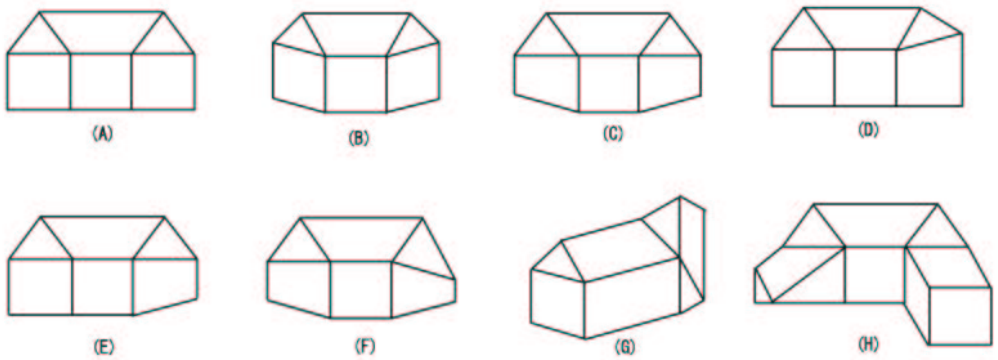


Figure 7: Patterns of 3-facets houses

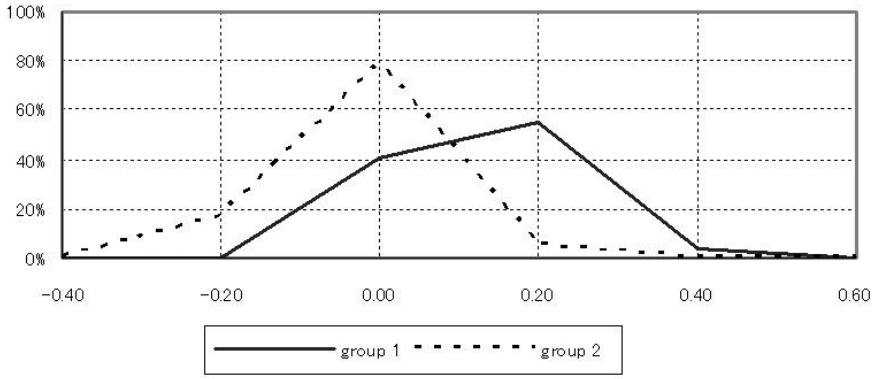


Figure 8: Sample-score graph by quantification method of the 2nd type for discrimination

3.2. Comparison between the images of the present and future status

Comparing the contents of the drawings of the present and the future status, some particular activities are visualized in the drawings of the future village such as enclosing land for stock-breeding, fish breeding, or tree plantation (Fig. 9). As for the objects commonly added in the

Table 4: Score of categories by HAYASHI's discrimination function analysis

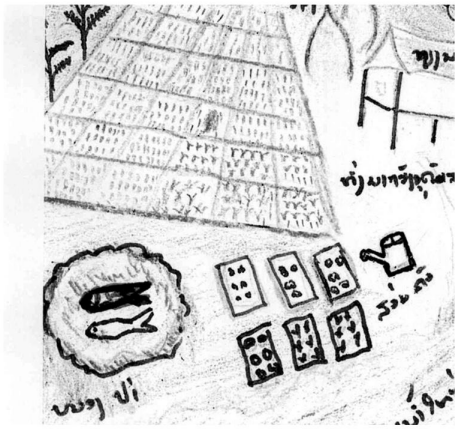
item	*category*	*frequency*	*score*	*range*
sex	male	204	-0.0003	0.0020
	female	36	0.0017	
tribe	Lao Loum	76	-0.0224	0.0526
	Lao Kang	84	0.0301	
	Lao Soung	48	-0.0221	
	(n.a.)	32	0.0073	
age	Under 20	36	0.1045	0.1457
	21 – 30	42	-0.0412	
	31 – 40	76	-0.0122	
	41 – 50	56	-0.0216	
	Over 51	14	-0.0209	
	(n.a.)	16	0.0252	
networking of roads	drawn	38	-0.0379	0.0450
	not drawn	202	0.0071	
top view of mountain	drawn	5	0.0154	0.0157
	not drawn	235	-0.0003	
zoning village area	drawn	31	-0.0403	0.0463
	not drawn	209	0.0060	
top plan of objects and/symbol	drawn	4	-0.1947	0.1980
	not drawn	236	0.0033	
direction	drawn	30	-0.0794	0.0908
	not drawn	210	0.0113	
legend	drawn	8	0.1186	0.1227
	not drawn	232	-0.0041	
notation	drawn	118	0.0064	0.0126
	not drawn	122	-0.0062	
mountain ridge	drawn	174	0.0504	0.1832
	not drawn	66	-0.1328	
sun	drawn	83	-0.0050	0.0076
	not drawn	157	0.0026	
continuity (from close view to distance)	drawn	56	-0.0587	0.0766
	not drawn	184	0.0179	
perspective of road/river	drawn	57	-0.0361	0.0474
	not drawn	183	0.0113	
elevation of buildings	drawn	162	0.0107	0.0329
	not drawn	78	-0.0222	
perspective of buildings	drawn	13	0.0303	0.0320
	not drawn	227	-0.0017	
projection of buildings	drawn	139	-0.0273	0.0648
	not drawn	101	0.0375	
comparison with the reality	reflecting the real location	151	0.0154	0.0445
	imaginary scenery	73	-0.0255	
	collage of objects	16	-0.0291	
direction of mountain	right above	7	0.1290	0.2813
	1 direction	159	-0.0545	
	2 directions	12	0.0590	
	4 directions	2	0.2268	
	not drawn	60	0.1100	
direction of house	right above	1	0.3363	0.3617
	1 direction	173	-0.0051	
	2 directions	48	0.0164	
	3 directions	13	-0.0084	
	not drawn	5	-0.0254	
direction of tree	1 direction	197	0.0017	0.1195
	2 directions	17	-0.0092	
	3 directions	2	-0.1174	
	not drawn	24	0.0021	
direction of electricity-pole	right above	6	-0.1411	0.3881
	1 direction	102	0.0123	
	2 directions	10	0.1398	
	3 directions	3	0.2471	
	not drawn	119	-0.0214	
paddy field	drawn	121	0.0209	0.0421
	not drawn	119	-0.0212	
paddy field (parallel & rectangular ridges)	drawn	37	0.0088	0.0104
	not drawn	203	-0.0016	
paddy field (parallel ridges, not rectangular)	drawn	52	-0.0254	0.0324
	not drawn	188	0.0070	
paddy field (radial ridges)	drawn	30	-0.0496	0.0567
	not drawn	210	0.0071	

future village, there are new paddy fields, water supply systems, markets, new buildings of a school, cars, and so on. Taking paddy fields as an example, 67% of the drawings on the future village contain paddy fields in contrast to 34% in the present village images. These points seem to be corresponding to their interesting topics coming up in the everyday conversation and the real situation around the target area.

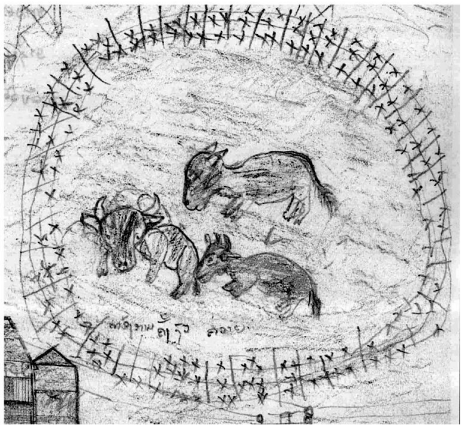
The style of houses shows an outstanding difference between the presence and the future. Among 120 examinees, 92 people change the style of house in varying degrees in the future images. Examinees sometimes draw houses in detail such as stilt-house with bamboo-woven-wall and thatch-roof, in the present image, so-called "temporary house" by villagers (Fig. 10(a) shows a sample of drawing and a photo of a real house); on the other hand the houses in the future image are frequently changed to the modernized two-stores houses which villagers call "permanent house" (Fig. 10(b)). Concerning the schools in the drawings, the same trend can be recognized, too.

While there is a lot of cases where the present images show the fairly realistic geographic-features, the future images show a marked tendency that particular motifs, mainly of house and/or schools, are picked up (Fig. 11) without reference to the physical aspect of their villages. In this connection, considering the breadth of the area shown in the images and also the scale of the houses, there seems to be a trend that the future images are drawn as a closer view than the present ones (Fig. 12).

"Multiple directions of objects" is also the topic that was discussed in the previous paper [2]. This characteristic is again seen in many drawings this time. As Figs. 13 and 14 show, mountains or objects are sometimes placed in multi-directions. The present images show this tendency slightly more than the future images.



paddy-field, nursery and fish pond



enclosing land and stockbreeding

Figure 9: Villagers' expecting activities in future

4. Conclusion

The conclusions of the above analysis are as follows:

(1) 34 of 120 examinees (28.3%) drew houses as 3-facets figures, and – with respect to the number of drawings – 47 (27 for the present and 20 for the future image) of 240

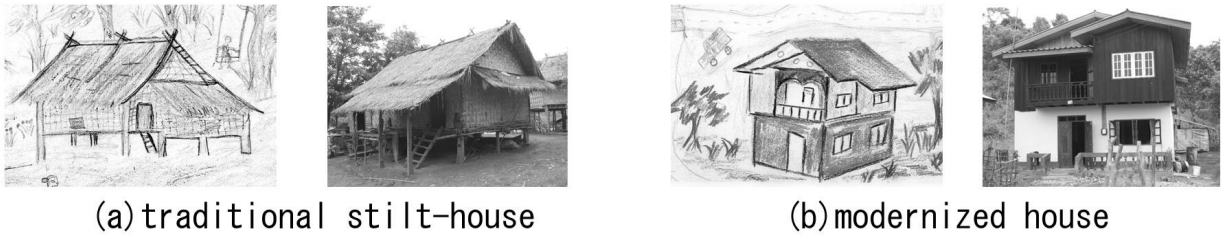


Figure 10: Traditional stilt-house and modernized house

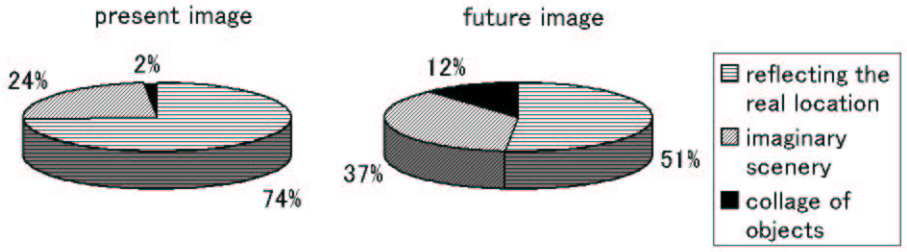


Figure 11: Comparison of the drawing style between present and future image

drawings include 3-facets figures. As the average of their age is 33.5 years, it implies that drawing 3-facets figures of an object does not necessarily mean the style specific to children, though those pictures have been discussed in the field of "developmental psychology". Then, the patterns of 3-facets figures can be classified into 8 patterns: 94.6% of examinees who drew 3-facets figures use pattern A, which is symmetrical and orthogonal projection-like. Furthermore, the directions of objects in drawings are the important impacts on the discrimination of the drawings containing 3-facets figures.

(2) While there is a lot of cases where the present images show the fairly realistic geographic-features, the future images show a marked tendency that particular motifs are picked up, and in this connection, there is a trend that the future images are drawn as a closer view than the present ones are. Houses shows this clearly, and what's more, the transformation of their styles show an outstanding difference between the presence and

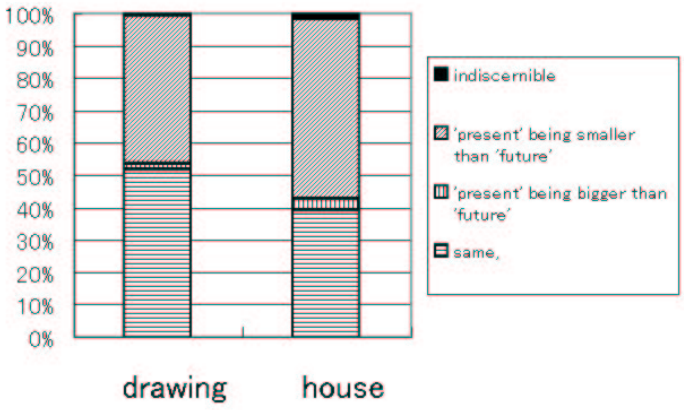


Figure 12: Comparison of the scale of drawing and house image between present and future

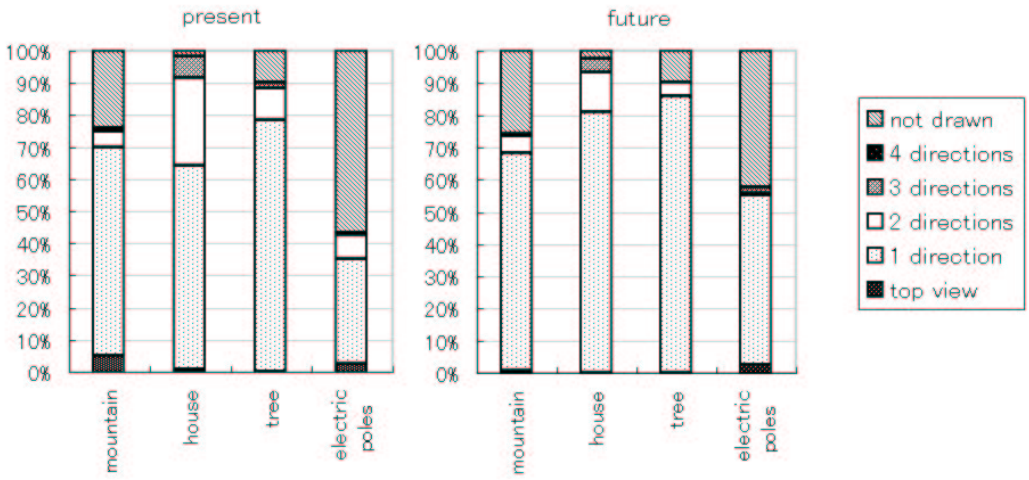


Figure 13: Consistency of directions in drawings

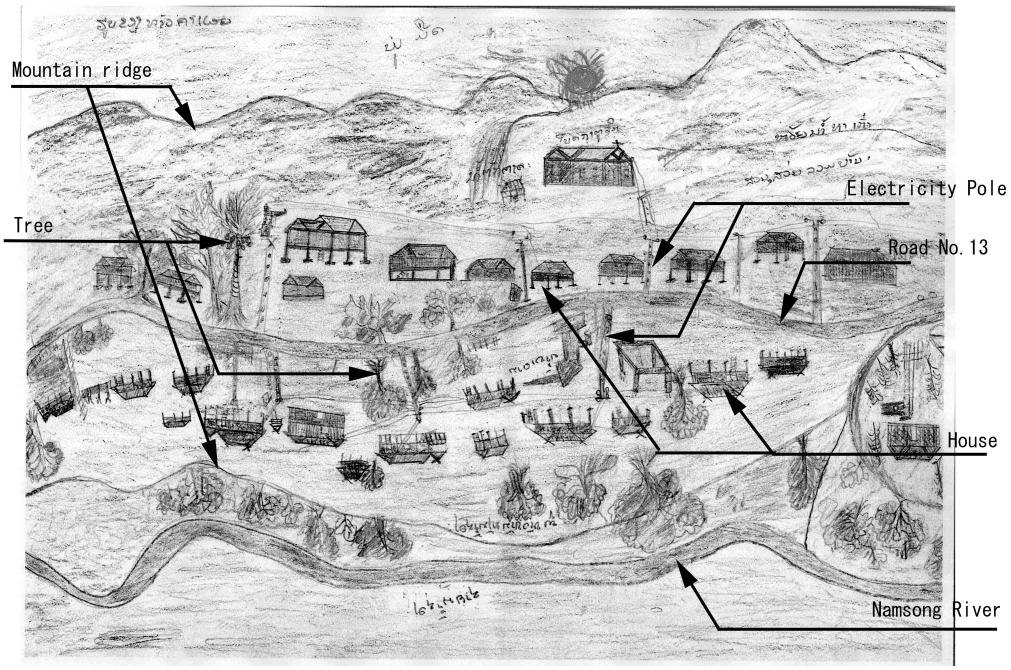


Figure 14: Sample of multi-directions

the future. Multiple directions in the layout of objects is also the unique attribute of villagers' drawings.

As we now understand that these villagers' drawings are not childish scrawl and show some tendencies in comparison between the present and the future images, for the further steps, we need an in-depth analysis on the contents in drawings to discuss on the villagers' vision for future development.

Acknowledgement

The work reported in this paper is based on the research that was carried out in cooperation with the National University of Laos and the Forest Conservation and Afforestation Project in Laos.

References

[1] J. Goodnow: *Children's Drawing*. Saiensu-sha Co., Ltd Publisher, 1989.

[2] J. Komoto, K. Yoshida: *Characteristics of villagers' drawing figures on their life-space in Lao P.D.R.*. Journal of Graphic Science of Japan **34**, no. 4, 3–8 (2000).

[3] *The Rural Development Programme 1998–2002, The 'Focal Site' Strategy Government Document, Sixth Round Table Follow-Up Meeting*. Lao People's Democratic Republic, 1998.

[4] *Country Strategy Note, Lao PDR and the UN until 2000*. Artasoa Press, 1996.

[5] *Laos – a travel survival kit*. 1st ed., Lonely Planet Publications, 1994.

Received August 1, 2002; final form June 23, 2003