Pesticide regulations and farm worker safety: the need to improve pesticide regulations in Viet Nam

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Abstract Agricultural pesticide use in Viet Nam has more than tripled since 1990. However, pesticide legislation and regulations have not been developed in response to this large increase in usage, as a result of which pesticides pose a serious threat to human health and the environment. This paper identifies the need to improve pesticide regulations in Viet Nam through a comparative analysis of pesticide regulations in Viet Nam and the United States of America, where the rate of acute poisoning among agricultural workers is much lower than in Viet Nam and where information pertaining to pesticide regulations is made accessible to the public. The analysis identified several measures that would help to improve Viet Nam's pesticide regulations. These include enhancing pesticide legislation, clarifying the specific roles and active involvement of both the environmental and health sectors; performing a comprehensive risk–benefit evaluation of pesticide registration and management practices; improving regulations on pesticide suspension and cancellation, transport, storage and disposal; developing import and export policies and enhancing pesticide-related occupational safety programmes.

Abstracts in عربي, 中文, Français, Русский and Español at the end of each article.

Introduction

Pesticide poisoning is a global public health problem. An estimated three million acute poisonings occur worldwide each year.[1] Pesticide-related poisonings are more frequent and serious in developing countries despite the fact that pesticides are sold in greater quantities in developed countries.[2] One reason for this is the lack of rigorous pesticide control laws and of training programmes for pesticide inspectors and users in the developing world.[2,3] Farah has indicated that about 25% of developing countries lack laws regulating pesticide distribution and use, and about 80% have insufficient resources to enforce existing pesticide-related legislation.[4]

In Viet Nam, a developing country, pesticide consumption increased from 14 000 tons under 837 trade names in 1990 to 50 000 tons under more than 3000 trade names in 2008.[5,6] However, pesticide control laws have not been developed and implemented in concert with these increases for several reasons, including a lack of administrative and enforcement resources; insufficient knowledge of the law on the part of regulators; a lack of incentives for making regulators enforce the law; limited environmental standards; and poor cooperation, coordination and consistency in implementing regulations on the part of the relevant authorities.[7] Nevertheless, the need to address these gaps and limitations has not been properly evaluated.

A market survey conducted by the Plant Protection Department in 2000 reported problems with improper storage and use of pesticides and a lack of knowledge about pesticide safety and regulations in Viet Nam.[8] The survey found 2800 pesticide retailers operating without a business licence; over 5000 retailers selling pesticides without having a store or stores failing to meet safety regulations; and the sale of 2500 kg of banned pesticides and of 10 000 kg of illegally imported or counterfeit pesticides. In terms of occupational safety, a high percentage of farmers are unfamiliar with pesticide safety practices such as compliance with instruction on the label, proper spraying techniques, proper use of protective equipment and safe pesticide disposal.[9,10] Consequently, farmers are at high risk of being harmed by pesticide exposure. In a 2002 study by Murphy, 31% of surveyed farmers in northern Viet Nam were found to have at least one symptom of pesticide poisoning.[9] In another study published in 2007, Dasgupta found that 35% of farmers in southern Viet Nam showed blood cholinesterase levels indicative of acute pesticide poisoning and that 21% of the farmers had chronic signs of poisoning.[10]

The objective of this study was to compare pesticide regulations in Viet Nam and the United States of America to identify ways in which pesticide regulation in Viet Nam can be improved. The study focused exclusively on pesticide regulation aimed at reducing occupational exposure among farmers. The United States was chosen as the reference country because it has established the benchmark for developing pesticide regulations. For this reason, the United States has a much lower rate of acute poisoning among agricultural workers than Viet Nam (53.6 versus 35 000 per 100 000 population).[1,10,11] Moreover, the United States Environmental Protection Agency (EPA) model is well-established and posts information on its web site in English on pesticide regulations.

Data collection and analysis

Information on pesticide regulations was obtained from the relevant web sites, directly from management agencies and from published research papers. The pesticide regulatory information of the United States was found on the EPA's web site and in research papers. The pesticide regulatory documents for Viet Nam were obtained from the relevant official web sites, including those of the Ministry of Agricultural and Rural Development, and from research papers. The keywords used to search the web sites were *pesticide regulation* (for English) and *hoa chat bao ve thuc vat* (for Vietnamese).

United States and Vietnamese regulations pertaining to pesticide registration, suspension and cancellation, label-

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ling, transport, storage and disposal, as well as import and export policy, were compared. Any regulation applied in the United States that might not be applicable to management systems in Viet Nam were excluded from the comparison. Areas in need of improvement in Vietnamese pesticide regulations were identified through this comparative analysis.

Legislative basis for pesticide regulation

In the United States, the EPA regulates pesticide registration, manufacture and distribution under the authority of the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). In addition, the Federal Food, Drug and Cosmetic Act has authorized the EPA to establish tolerable levels for pesticide residues in foods.[12] The FIFRA requires that all pesticides distributed and sold in the United States be registered by the EPA after pesticide approval, which is granted upon determination that the substance "will not generally cause unreasonable adverse effects on the environment". The FIFRA defines "unreasonable adverse effects on the environment" as "(i) any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide, or (ii) a human dietary risk from residues that result from a use of a pesticide in or on any food inconsistent with the standard under section 408 of the Federal Food, Drug, and Cosmetic Act".[13]

In Viet Nam, the Ministry of Agricultural and Rural Development (MARD) regulates pesticides under the authority of the Ordinance on Plant Protection and Quarantine (OPPQ), recommended by the National Assembly Standing Committee in 1993.[14] However, this legislation has not been enacted as law yet. Pesticide regulation is one chapter comprising six articles in the OPPQ, whose definition of "pesticide" is the same as the FIFRA's: "pesticides are products made from chemical, botanical, or biological materials in order to prevent and eliminate pests that are harmful to botanical resources".[14] The OPPQ requires demonstration that a pesticide is "safe to human and ecological systems" before it can be considered for registration. The OPPQ assigned the Ministry of Industry, the Ministry of Science, Technology and Environment, the Ministry of Health and the Ministry of Trade the task of collaborating with the MARD in the management of pesticide manufacture, import and export, distribution, storage, labelling, packaging and advertisement.[14] However, the roles of each ministry are poorly defined.

Pesticide registration

In the United States, a registrant must submit data on a given pesticide to the EPA for registration, as required by the FIFRA.[13] The EPA decides whether to register the pesticide based on the results of a risk–benefit evaluation, which weighs the pesticide's potential adverse effects against the benefits of its use.[15] Registration of the pesticide is not approved unless the pesticide meets: (i) the efficiency and labelling requirements of the FIFRA; and (ii) has been shown to not generally cause "unreasonable adverse effects on the environment".[16] Under the FIFRA, the EPA administrators also take into account the economic, social and environmental costs and benefits of the pesticide.[13]

The EPA dictates what procedures and data are required to evaluate the risk–benefit ratio of a pesticide and provides guidance in determining whether a pesticide causes unreasonable adverse effects.[13,17] The results of these risk–benefit analyses are then published together with the EPA's proposed regulatory decision, followed by the comments of stakeholders. If the pesticide is classified as destined for cancellation or restricted use, the US Department of Agriculture and the EPA's Scientific Advisory Panel are requested to review the risk–benefit analyses before the final regulatory decision.[18]

After registration of a pesticide, the registrant is still required to inform the EPA of any "additional factual information regarding unreasonable adverse effects on the environment". The information that a registrant must submit consists of: toxicological and epidemiological studies, data on pesticide residues in foods and/or the environment, reports of adverse effects and other information of interest in assessing the desirability of continued registration. The registrants will be convicted of a violation if they do not report the required information.[13,19]

In 2002 under the OPPQ, the MARD issued Decision 145/2002/QD-BNN in Viet Nam concerning regulations on pesticide registration procedures, manufacturing, processing, bottling, packaging, export and import, sale, storage, transport, use, labelling, advertisement and organization of workshops or conferences.[20] A pesticide is considered for registration provided it has not been listed as unauthorized and has been shown to have reasonable bio-effectiveness in crop protection. The Decision stipulates that a pesticide is unauthorized for registration if: (i) it is in the MARD's list of pesticides for restricted use in Viet Nam; (ii) it has never been used in other countries; (iii) its trade name and the name of its active ingredient are identical; (iv) the pesticide or its active ingredient has a toxicity level of I as classified by the World Health Organization (WHO) unless it is used exclusively in construction or to disinfect stores or stations. To assess benefits, a registrant is required to conduct a bio-effectiveness evaluation through small- and large-scale testing of the pesticide with proposed crops.[20] Nevertheless, these regulations have not been rigorous enough to properly conduct risk–benefit analyses, since risk assessment cannot be based entirely on toxicity data, even though the results of bio-effectiveness trials can yield information of use in evaluating the economic benefits of a pesticide. Moreover, the regulations make no provision for continuing reports of data on a pesticide's adverse effects on man and the environment during its registration period.

Suspension and cancellation

The EPA may reconsider the registration of a particular pesticide if new evidence of potential adverse effects emerges. The EPA has authority to restrict, suspend or cancel a pesticide's registration.[13] A decision to cancel or suspend a pesticide also depends on the results of cost–benefit analyses focusing particularly on the impact of the cancellation on the production and price of agricultural commodities, retail food prices and other economic factors. Before deciding to cancel or suspend a pesticide's registration, an administrator must consider restricting its use. If restriction is deemed unfeasible, the EPA will cancel the pesticide and provide a full justification for its action.[13]

In Viet Nam, the OPPQ contains no specific clause on the suspension or

cancellation of a registered pesticide. Instead, the MARD decides to restrict or prohibit the use of a pesticide in response to an alert from international organizations (such as WHO, the Food and Agriculture Organization and the United Nations Environment Programme) that evidence of toxicity or of the potential for dangerous side-effects has emerged in connection with the use of the pesticide.[21] Such decisions, however, are usually made when a new pesticide is first registered, rather than after a pesticide is already registered.

Pesticide labelling

In the United States, the labelling and use of pesticides are also subject to EPA regulation under the FIFRA. Accordingly, the sale and distribution of any mislabelled pesticide is an illegal action.[13] In addition to directions for use, a pesticide's label must contain a statement to the effect that it is safe for human health and the environment. Altering a label or using a pesticide that fails to comply with labelling requirements is prohibited.[13]

Similarly, under the OPPQ, the MARD requires that the label of any pesticide distributed in Viet Nam be in Vietnamese and that the label contain information on toxicity; trade name; ingredients; directions for use; safety during or after use; first aid in case of poisoning; mixing with other pesticides; manufacturer; expiry date; storage, mixing and using; re-entry time following pesticide application, and colour strip coding for toxicity level.[20]

Worker protection

The Worker Protection Standard (WPS), which is the United States federal regulation issued to protect people from occupational exposure to agricultural pesticides, contains regulations on pesticide safety training, notification of pesticide application, use of personal protective equipment, field re-entry time restrictions following pesticide application and emergency medical assistance.[22] The EPA is authorized to work closely with state-level pesticide regulatory agencies in conducting inspections to ensure that the regulation is implemented and enforced in agricultural communities.

In the United States, a pesticide is considered suitable for general use if it has no unreasonable adverse effects on the environment when used as indicated on the label. A pesticide is for restricted use if it "may generally cause, without additional regulatory restriction, unreasonable adverse effects on the environment".[13] Under the WPS, only a certified applicator or someone supervised by a certified applicator can apply pesticides whose use is restricted, whereas anyone can use non-restricted pesticides. The EPA is authorized to issue certification standards for pesticide applicators to ensure that they are competent in the safe and effective use of pesticides.[13] In Viet Nam, no equivalent WPS has been designed, and despite the fact that MARD regularly issues a list of pesticides for restricted use, Viet Nam has established no similar requirements for the training or certification of pesticide applicators.

Pesticide storage and disposal

In the United States the EPA regulates pesticide storage and disposal for four categories of pesticide users: household consumers, farmers, retailers and commercial applicators. For each of these groups it provides detailed instructions,[23] but the corresponding state and local laws are often stricter than the federal regulations. For example, most states have developed programmes whereby farmers can "collect and dispose of pesticides in a safe and simple way at little or no cost".[24]

In Viet Nam, regulations on pesticide storage and preservation apply to everyone in general, rather than to different types of users.[20] They focus on storage and preservation requirements for industrial manufacturers and distribution companies rather than individual retailers and household applicators. Pesticide disposal is regulated by a national chemicals law on hazardous waste management, as it is in the United States.[25,26] However, no specific regulatory programme for the safe storage and disposal of agricultural pesticides has been developed by provincial agencies.

Pesticide import and export policy

In the United States the EPA regulates both the import and export of pesticides under the FIFRA (Section 17). However, the FIFRA has been criticized for authorizing the EPA to comprehensively regulate the domestic use of pesticides while neglecting regulation on pesticide exportation.[17] Although the EPA issued the new export policy for pesticides "to protect public health and the environment from unreasonable adverse effects of pesticides, both domestically and internationally", the agency still allows companies to export pesticides not registered for use in the United States as long as they fulfil certain labelling and warning requirements. Moreover, despite a domestic requirement that product package labels be multilingual, exporters are only required to print multilingual labels for shipping containers but not for attachment to the product packages.[17] Therefore, applicators in foreign countries may not have an opportunity to review warning information.

In Viet Nam, any organization that imports or exports pesticides is required to obtain permission for both from the MARD. The regulations issued by the MARD on the importation of pesticides are relatively comprehensive. Information must be furnished on the trade licence, the contract with exporters, the product manufacturer, the results of experimental studies and the listing of the pesticide among those registered for use in Viet Nam.[20] However, no regulation is in place for the importation of pesticides that are not registered for use in the exporting country. With respect to pesticide export there is only a general statement to the effect that individuals and organizations belonging to a class of commercial enterprise that is allowed to operate under the law and is a registered trader of pesticides and agricultural equipment are allowed to import and export pesticides.[20]

Improving pesticide regulation in Viet Nam

Table 1 summarizes the areas needing improvement in Viet Nam's pesticide regulation. They include identifying the specific roles of related sectors and facilitating their active involvement in pesticide management and regulation to ensure that a registered pesticide will not cause unreasonable harm to human beings and the environment; upgrading the OPPQ to the category of an official law that embraces, among other things, pesticide regulation, or developing a separate act and regulation; enhancing the role

played by the multisectoral Pesticide Technical Advisory Committee by developing an appropriate mechanism for the coordination of these multiple sectors. Moreover, guidelines on conducting risk–benefit evaluations before pesticide registration should be developed for government officials, scientists and administrators. An additional clause on the restriction, cancellation and suspension of an existing pesticide registration should be developed and should include a requirement that registrants periodically submit data on a registered pesticide's effects. Specific regulations on the transport, storage and disposal of pesticides should be developed for various types of individual pesticide applicators such as farmers, household consumers and small retailers. Restricted regulations on the importation of pesticides that are not registered or whose use is prohibited in exporting countries should be developed, and information on countries exporting pesticides should be made accessible through reliable channels. In addition, more specific requirements are needed for pesticide labelling by exporters, especially with respect to content warnings. Finally, regulations governing worker protection standards, including pesticide safety training, notification of pesticide application, use of protective equipment, emergency medical assistance, and certification of training programmes for those who apply pesticides, especially restricted ones, should be developed.

Conclusion

Pesticide regulations in Viet Nam use a framework similar to the one that exists in the United States, in which pesticide registration is the crucial element in regulating pesticide distribution and use. However, some aspects need to be reformed to improve pesticide regulations and reduce the risk of harmful effects on humans and the environment from the use of pesticides. Through our analysis we have identified various areas of pesticide legislation that need improvement in Viet Nam. The legislative basis for pesticide regulation in Viet Nam, namely the OPPQ, should be reviewed and revised to reflect the International Code of Conduct on the Distribution and Use of Pesticides, since the OPPQ was adopted 10 years before the Code was issued by WHO and the Food and Agriculture Organization.[27] Moreover, regulations alone may not be sufficient to reduce the risk posed by pesticides. To protect agricultural workers, more comprehensive needs assessments involving the farming community should be performed. ■

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Table 1. **Summary of suggested needs for improving pesticide regulations in Viet Nam**

Criterion	Regulation		Improvements needed in pesticide regulations
	United States	Viet Nam	
Responsible agency	EPA	MARD	Establish specific roles and active involvement of various sectors, including environmental, health, and labour sectors
Legislative basis	FIFRA	OPPQ	Upgrade OPPQ to a law
Registration	Risk–benefit evaluation	Toxicological classification;	Develop risk–benefit evaluation requirement, guidance and training administrators
		Bio-effectiveness assessment	Develop mechanism for involvement of health and environmental sectors in pesticide registration
			Require continuing reports of factual information of a pesticide from registrants
Suspension and cancellation of existing pesticide registration	New evidence of adverse effects, or cost-benefit evaluation		Add a specific clause of restriction, cancellation and suspension of an existing pesticide registration
Pesticide labelling	Directions for use and appropriate information for environmental and health protection	Direction in use and adequate information for environmental and health protection	NA
Worker protection standard (WPS) and certification training	Applied for restricted pesticides		Add a clause of WPS and certification training requirement
			Develop training programmes for certification of pesticide applicators
Transport, storage and disposal of pesticides	Applied to household consumers, farmers, retailers and commercial applicators	Focus on general storage requirements for commercial registrants and retailers	Introduce regulations on individual pesticide applicators, including farmer and household consumer
Pesticide import and export	Comprehensive regulations on domestic pesticide use, but little regulation on exports	No specific regulation on pesticides not registered in exporting countries	Introduce specific regulations restricting importation of pesticides not registered in exporting countries
			Require appropriate warning labels for imported pesticides

EPA, Environmental Protection Agency; FIFRA, Federal Insecticide, Fungicide and Rodenticide Act; MARD, Ministry of Agricultural and Rural Development; NA, not available; OPPQ, Ordinance on Plant Protection and Quarantine.

ملخص

لوائح المبيدات وسلامة المزارعين: الحاجة إلى تحسين لوائح مبيدات في فييت نام

تضاعف استعمال المبيدات الزراعية في فييت نام إلى أكثر من ثلاثة أضعاف منذ عام 1990. ومع ذلك، لم يتم وضع لوائح وتشريعات المبيدات استجابة لهذه الزيادة الكبيرة في الاستعمال، ونتيجة لذلك تمثل المبيدات تهديدًا خطيرًا على صحة الإنسان والبيئة. تحدد هذه الورقة الحاجة إلى تحسين لوائح المبيدات في فييت نام من خلال تحليل مقارن للوائح المبيدات في فييت نام والولايات المتحدة الأمريكية، حيث ينخفض معدل التسمم الحاد بين العمال الزراعيين بشكل كبير عنه في فييت نام، وحيث تتوافر إتاحة الوصول إلى المعلومات المتعلقة بلوائح المبيدات للجمهور. وحدد التحليل عددًا من التدابير التي ستساعد على تحسين لوائح المبيدات في فييت نام. وتتضمن هذه التدابير تعزيز تشريعات المبيدات وتوضيح الأدوار المحددة ومشاركة القطاعين البيئي والصحي على نحو نشط؛ وإجراء تقييم شامل للمخاطر مقابل الفوائد جراء تسجيل المبيدات وممارسات الإدارة؛ وتحسين اللوائح المعنية بتعليق المبيدات وإلغاءها ونقلها وتخزينها والتخلص منها؛ ووضع سياسات للاستيراد والتصدير وتعزيز برامج السلامة المهنية المرتبطة بالمبيدات.

摘要

农药管理和农场工人的安全:改善越南农药管理的必要性

自1990年以来,越南的农药使用已增至三倍以上。然而,由于相应的农药法律和法规的制定并未相应跟上,农药对人类健康和环境构成了严重威胁。本论文通过比较越南和美国的农药监管,确定越南改善农药监管的必要性,在美国,农业工人的急性中毒率远远低于越南,而且农药管理的相关信息也向公众公开。分析确定了若干有助于改善越南的农药监管的措施。这些措施包括加强农药立法,明确环境和卫生部门的具体职能和积极参与;对农药登记和管理实践进行全面的风险-效益评价;改进对农药暂停和取消、运输、贮存和处置的监管;制定进口和出口的政策以及强化与农药相关的职业安全计划。

Résumé

Réglementations en matière de pesticides et sécurité des agriculteurs: la nécessité d'améliorer les réglementations sur les pesticides au Viet Nam

L'utilisation de pesticides agricoles au Viet Nam a plus que triplé depuis 1990. Cependant, la législation et les réglementations en la matière n'ont pas été développées en ligne avec cette importante augmentation, ce qui fait que les pesticides représentent aujourd'hui une grave menace pour la santé humaine et l'environnement. Cet article identifie la nécessité d'améliorer les réglementations en matière de pesticides au Viet Nam à travers une analyse comparative de ces réglementations au Viet Nam et aux États-Unis d'Amérique, où le taux d'intoxication aiguë parmi les travailleurs agricoles est nettement inférieur qu'au Viet Nam et où l'information sur les réglementations des pesticides est accessible au public. L'analyse a identifié plusieurs mesures qui pourraient améliorer les réglementations sur les pesticides au Viet Nam, notamment: le renforcement de la législation sur les pesticides, la clarification des rôles spécifiques et de l'implication active du secteur environnemental et du secteur sanitaire; l'établissement d'une évaluation globale des risques-bénéfices de l'enregistrement des pesticides et des pratiques de gestion; l'amélioration des réglementations sur la suspension et la suppression, le transport, le stockage et l'élimination des pesticides; le développement de politiques d'importation et d'exportation et le renforcement des programmes de sécurité au travail liés aux pesticides.

Резюме

Нормативы работы с пестицидами и безопасность сельскохозяйственных рабочих: необходимость совершенствования нормативов работы с пестицидами во Вьетнаме

В период с 1990 г. сельскохозяйственное использование пестицидов во Вьетнаме увеличилось более чем в три раза. Однако такое значительное увеличение использования пестицидов не привело к разработке соответствующего законодательства и нормативов работы с пестицидами, в результате чего пестициды стали серьезной угрозой для здоровья человека и окружающей среды. В данной статье аргументируется необходимость совершенствования нормативов работы с пестицидами во Вьетнаме путем сравнительного анализа нормативов работы с пестицидами во Вьетнаме и США, где частота острых отравлений среди работников сельского хозяйства значительно ниже, чем во Вьетнаме, и где информация, относящаяся к нормативам работы с пестицидами, доступна для общественности. В результате анализа выявлено несколько мер, которые будут способствовать совершенствованию нормативов работы с пестицидами во Вьетнаме. К ним относятся: совершенствование законодательства о пестицидах; уточнение конкретных ролей и мероприятий в сфере защиты окружающей среды и здравоохранения; выполнение всеобъемлющей оценки рисков и выгод практики регистрации и контроля над оборотом пестицидов; совершенствование положений о приостановлении использования и запрете пестицидов, а также их транспортировки, хранения и утилизации; развитие импортно-экспортной политики и совершенствование профессиональных программ безопасности для работников, имеющих дело с пестицидами.

Resumen

Reglamento en materia de plaguicidas y seguridad de los trabajadores agrícolas: la necesidad de mejorar el reglamento en materia de plaguicidas en Viet Nam

El uso de plaguicidas agrícolas en Viet Nam se ha triplicado desde 1990. Sin embargo, la legislación y el reglamento en materia de plaguicidas no se han desarrollado en consonancia con este gran aumento en el uso, de manera que los plaguicidas se han convertido en una enorme amenaza para la salud humana y para el medio ambiente. Este documento identifica la necesidad de mejorar el reglamento en materia de plaguicidas en Viet Nam mediante un análisis comparativo de dicho reglamento en Viet Nam y en los Estados Unidos de América, donde la tasa de intoxicaciones agudas entre los trabajadores agrícolas es mucho menor que en Viet Nam y donde la población tiene acceso a la información relacionada con el reglamento en materia de plaguicidas. El análisis identificó varias medidas que ayudarían a mejorar el reglamento en materia de plaguicidas en Viet Nam. Estas incluyen: mejorar la legislación en materia de plaguicidas, clarificar las funciones específicas y la participación activa del sector medioambiental y del sector sanitario; realizar una evaluación completa de los riesgos y beneficios del registro de plaguicidas y prácticas de tratamiento de los mismos; mejorar el reglamento sobre suspensión, cancelación, transporte, almacenamiento y eliminación de plaguicidas; desarrollar políticas de importación y exportación y mejorar los programas de seguridad relacionados con plaguicidas.

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